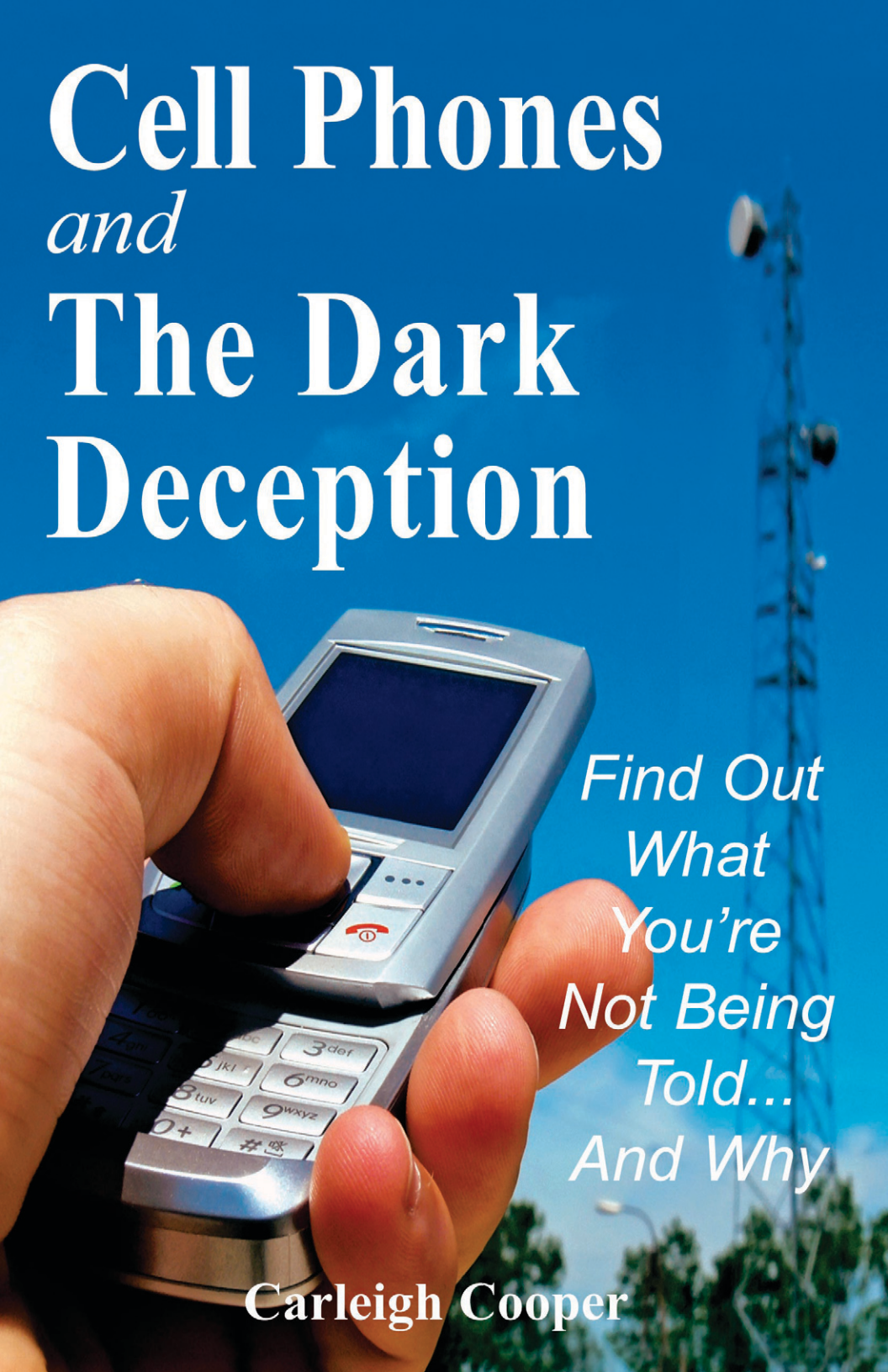
CELL PHONE
DANGERS
COLLECTION

Cell Phones *and* The Dark Deception



Find Out What You're Not Being Told... And Why

Carleigh Cooper

Cell Phones *and* The Dark Deception

Table of Contents

Preface ix

Chapter 1 - **Where the Dark Deception Lies** 15

- Deception Stems from Multiple Assumptions
- The Industry's Belief System
- The Birth of Deception
- A Reconciliation Attempt

Chapter 2 - **The BIG Question** 25

- If Cell Phones Are Dangerous, Why Don't You Know About It?
- Who Are You Supposed to Believe?
- The Government's Role
- An Opportunity to Alert the Nation
- Who Governs the Giants?
- Why Are There So Many Contradicting Reports?
- Industry Concealment
- The Smoking Gun

Chapter 3 - **A Desperate Search for Answers** 37

- The Search Begins
- Radiofrequency Microwave (RF/MW) Radiation
- Ionizing vs. Non-Ionizing RF/MW Radiation
- The Power of Cell Phone Radiation
- Cranial Radiation Absorption

Chapter 4 - **Who's Protecting You?** 47

- How Safety Standards Are Established
- Heating
- Absorption
- Short Term Research
- Ignoring Potentially Damaging Studies
- Adverse Health Effects
- Who Sets Safety Standards?
- Cell Phone Regulation or Exemption?
- Specific Absorption Rate (SAR)

Chapter 5 - **No Health Risk?** 61
- Prescription Drugs
- Medical Use of Non-ionizing Microwave Radiation
- Military Use of Non-lethal Weapons
- Mind Control
- Radiation Shielding Patents
- Long Term Studies Proving Safety
- Lloyd's of London Rejects Industry

Chapter 6 - **Hidden Health Hazards** 73
- The Human Body
- Identifying Problems
- Are You Sick?
- Dangerous Effects are Rarely Immediate
- Physical Concerns
- Optical Concerns
- Auditory Concerns
- Perceptual Concerns

Chapter 7 - **Neurological Nemeses** 89
- Delayed Reaction Time
- Slowing or Loss of Motor Skills
- Memory Loss
- Blood Brain Barrier (BBB) Permeability
- Headaches
- Anxiety
- Stress
- Suicide
- Fatigue
- Depression
- Concentration Difficulties
- Dizziness
- Sleep Impairments
- Learning Disabilities
- Neurotransmitter Function Impairments
- Autism
- Brain Damage
- Neurodegenerative Diseases
- Uncontrollable Shaking and Trembling

- Seizure – Like Activity / Epilepsy
- Dysesthesia

Chapter 8 – **Other Serious System Disorders** 107
- Cardiovascular
- Reproductive
- Respiratory
- Digestive / Gastrointestinal
- Urinary
- Hormonal
- Immune

Chapter 9 - **Genotoxic Damage & Cancer** 123
- Chromosome / DNA Damage
- Gene Transcription Activity Altered
- Cellular Calcium Ions Modified
- Stress Response Enhanced
- Significant Promotion of Multiple Cancers
- Rapid Cancer Growth
- Deceptive Studies

Chapter 10 - **Tower Trauma** 133
- Tower Exposure Studies
- 1996 Telecommunications Act
- Cellular Tower Placement
- Firefighters Fight Back
- Real People, Real Stories

Chapter 11 - **The Consequential Impact on Our Youth** 147
- Altered Brain Waves, Altered Behavior
- Teen Brain Damage
- Global Warnings to Parents

Chapter 12 - **Playing It Smart** 159
- Ways to Reduce Exposure

Conclusion - **What Now?** 169

Glossary of Terms 173

Preface

Hopeful. Yes, that's exactly what we were feeling. Hopeful. After years of searching and meeting with over thirty different doctors, neurologists and specialists, we finally met with one of the best toxicologists in the region. He conducted multiple tests on my late husband, Steve, and his exhaustive efforts were considered to be extremely thorough. The results were certain to reveal the disease or the source of the complications from which he suffered.

For over a decade no one had been able to diagnose or relieve Steve's myriad symptoms. Feelings of frustration and grief dominated, as we aggressively sought help and explored endless possibilities. It was vividly apparent that something was seriously wrong with him and he was only in his early forties. His health had been failing for years and it continued to decline; his ailments not only intensified, but new problems kept arising. The disconnected, but seemingly associated, symptoms made absolutely no sense to anyone.

As we anxiously waited for the toxicologist to enter the examination room in which we had been placed, I couldn't help but wonder about Steve's fate. Finally, the doctor came in and sat down across from us. He had a questionable smirk on his face as he reported that all of the test results had been received. Then he announced that he had good news. We were relieved, thinking, "Thank God he found something that wasn't too serious." That thought quickly faded when Dr. E proudly announced to Steve: "There's nothing wrong with you. No abnormalities were detected."

Dumbfounded, we sat there in disbelief. Steve's eyes grew big and his positive sense of hopefulness instantly shifted to anger. I can honestly say that in our 23 years of marriage, I had never seen so much rage bubbling up inside of him. He was usually mild-mannered. Without a doubt, it took every bit of restraint he had not to lunge at the doctor and grab his neck.

Instead, Steve lashed out verbally. “How can this be? How can all of these tests show absolutely nothing?” He wanted to know.

If you’ve ever been in a similar position, I don’t have to tell you how devastating this kind of so-called “good news” is. It’s heartbreaking to watch someone you love suffer agonizing pain day after day, month after month, and year after year. What’s worse is when no doctor can help or determine what’s wrong while your loved one is wasting away, you realize that there’s not a damn thing you can do but pray. All you can see is a hopeless situation where there’s no end in sight to your loved one’s miserable existence.

Steve was a kind, gentle man and a loving father, who had become someone we no longer recognized. The unquenchable energy he once used to play with his girls had been completely drained from him. Always fatigued, he spent the majority of his time in bed. He suffered from chronic, excruciating, and debilitating migraine headaches. He was constantly hearing a wide variety of unusual sounds inside of his head, ranging from ringing and chirping to high-pitched screeching. The once peaceful, patient man was also overcome with feelings of anxiety, which were completely out of character. He’d become easily agitated, even angry at times for no apparent reason.

In addition, his previously sharp, intellectual mind had become foggy. He was extremely forgetful and often confused. Frequently, memories of close family, familiar people, places and events were no longer easily recollected. Likewise, understanding and following short stories, television programs, or in-depth conversations posed a challenge. Depression, accompanied by feelings of worthlessness and hopelessness, had also afflicted this once virile young man.

One year after seeing the aforementioned physician, it was recommended that we visit a well-known Neurotoxicologist in southern California. With Steve not working, it was a financial stretch, but we were promised it would be worth the trip. After all, Steve’s problems were primarily neurological and he had been exposed to some toxic carcinogens at his previous job.

During the appointment we discussed the various chemicals Steve had been occupationally exposed to. There were only a couple that Steve recognized as being harmful, but few would have elicited the kind of complications he’d been experiencing. I asked the doctor if he was familiar with non-ionizing radiofrequency microwave (RF/MW) radiation and if he believed it was dangerous, because I

needed to know if Steve's chronic close-range exposure to it could have been responsible for all or part of his disassociated gamut of symptoms. The Neurotoxicologist suggested that it was certainly a possibility, considering Steve's professional position.

As a technician, Steve spent 40+ hours a week building power microwave amplifiers for the base stations of cell towers. Every day for sixteen years, he was constantly being blasted in the face with RF/MW energy and, initially, the exposure was never considered as a probable cause of Steve's illness. After all, it was the same energy and technology that was incorporated into all wireless communication devices and that had never been shown to be dangerous…or had it?

Following the consultation, a series of tests were given. And even though we were sure that every possible exam had already been conducted, we were wrong. The outcome of both a TOVA test and a Brain Spect divulged the hidden secrets that had laid dormant deep within Steve's being. He finally received a diagnosis of Toxic Encephalopathy - brain damage due to toxic exposure. To our surprise, the areas of the brain that were damaged coincided precisely with each and every one of his abnormalities. It all made perfect sense.

"Now, what can we do to help him?" I eagerly asked. "What's next?"

The doctor fell silent and glanced down at the floor prior to answering. "There's really nothing that can be done," he said. "This disorder is progressive. It's not going to get any better." Then he added, "At this point, I recommend that you be watchful for the development of a brain tumor or brain cancer."

After three more years of anguish, on June 14, 2007, my dear, sweet Steve ended his life. He was only 48. It had become unquestionably evident to everyone around him that his health and mind were deteriorating to a point of no return. It had been a long, tough battle, during which he fought the good fight, but the illness overcame him. As an act of unfathomable desperation, he opted out. He had reached that absolutely horrific place, where there were no more options and there was nowhere else to turn; a place where all quality of life was lost and hope for anything better was gone.

My purpose for writing this book is multi-faceted. While I am not a scientist, nor do I claim to be an expert in this particular field, I have been led by life's experiences to explore this subject in great detail. If you've ever faced difficult circumstances, where help

cannot be found, you know that you ultimately must rely on yourself to conduct a thorough investigation and find the answers you need. It doesn't take long to realize that no one cares about your situation as much as you do, so you have to be your own best advocate.

Believe me, if anyone had ever asked what topic I'd most like to study, given the time, I would have never said the effects of non-ionizing RF/MW radiation on the human body. I was not even familiar with the term. However, in the course of attempting to pinpoint Steve's source of aggravation, every other carcinogen that we knew he'd been exposed to had been ruled out. Through process of elimination, I began researching non-ionizing RF/MW radiation.

After months of reading through a multitude of credible studies, research papers, books, and other related literature, I was able to discover a great number of truths. Truths that, in my opinion, must be disclosed to the public. Our health is seriously being jeopardized, while the facts about cell phone dangers resulting from its RF/MW radiation exposure remain secret.

Living in blissful ignorance should no longer be an option for those who want to ascertain the definitive facts. *Cell phones have never been proven safe.* Like cigarettes, they were exempt from having to pass federally mandated FDA safety regulations. There are far more studies proving harm than safety when it comes to cell phones. I've invested 18 months into writing this book because there is no other document that addresses these dangers in such a clear, direct, comprehensible, and detailed format.

Furthermore, I strongly believe that all cell phone users have an undeniable right to know the risks they are taking every time they pick up their cell phones. I also believe that they have a right to learn how to protect themselves and their loved ones from harm.

I realize that Steve's exposure was greater than any you might experience. Nevertheless, research reveals that even the smallest injuries resulting from this type of exposure can accumulate and progress. In other words, prior to developing any permanent, recognizable damage from cell phone use, such as cancer, brain tumors, brain damage, or Alzheimer's disease, other adverse effects slowly and subtly creep in under the radar. It's so easy to fall into the trap of attributing frequent headaches, chronic fatigue, unprovoked anxiety, irritability, insomnia, concentration difficulties, and increased forgetfulness to stress. But is stress really the cause? Unfortunately, because of how the cell phone industry is governed in

the United States, you are likely unaware that these are all common symptoms experienced by cell phone users.

As a dedicated spouse and father, Steve was involved in every aspect of our lives. The four of us, Steve, myself, and our two daughters, were very close and we spent the majority of our free time together. We enjoyed camping, hiking, canoeing, going to the lake, and visiting the park. Together, we attended every parent-teacher conference, talent show, 4-H affair, and sporting event our children took part in. Therefore, it's no wonder that these uninvited changes were not only difficult for Steve, but for all of us. They systematically invaded the man we loved and inadvertently destroyed our happy family. Our lives were forever transformed. Living that life of uncertainty, without help or hope, was the closest to Hell that I ever want to get.

Once one of Steve's treating physicians asked if I needed him to prescribe me some sort of medication to help me cope with everything that was happening and, after much contemplation, I chose to trust God instead of taking drugs. Although I already had a close relationship with the Lord, my focus of prayer had always been on Steve. I rarely prayed for myself, but that day I made a selfish and desperate plea on my own behalf. I cried out and asked God to take me out of the deep, dark pit I was drowning in and He answered my prayer the very next day. Whether you're a believer or not, impossible times call for a God who can do impossible things. Without Him as the foundation in our lives, I shudder to think where we'd be today.

In the eight months prior to Steve taking his life, God really did some miraculous things. Through His divine intervention my being was somehow altered. I was happy and at peace, even though our situation hadn't changed. He placed me in a wonderful women's Bible study class that, in reality, was a desperately needed support group. He not only brought me into a deeper relationship with Him, but He touched both of our girls with that same love and intimacy. Together, they chose to rededicate their lives to Christ. Additionally, Steve, who rarely attended church, asked to join us the Sunday before taking his life and during that service, he took that same step of faith. That in itself was a miracle.

Another reason for writing this book is that I refuse to accept that, for more than a decade, the four of us went through such tragic torment for nothing. Some good has to come out of it. And while a part of that "good" was growing stronger in our Christian faith, some

of it should also be for the common good of others. Specifically, educating cell phone users on the real hidden dangers of cell phone use and RF/MW radiation exposure. Everything I've learned, you have a right to know. And as a Christian woman who is supposed to love her neighbor, how can I love you and not share this critical information with you?

Sadly, this information comes too late for many, who, like Steve, have been gravely deceived by the reality of this hazardous carcinogen. The truth is, cell phone use has never been proven safe. Some experts in this sphere of study even believe that the long-term illnesses endured by cigarette smokers will pale in comparison to those that will be experienced by cell phone users. If you're a cell phone user, get the facts. Don't wait until it's too late and don't allow the industry's propaganda or other misinformation to stand in the way of your continued good health and well-being.

You will soon discover why you're not hearing the whole truth. Educate yourself by reading this book. Knowledge is power. Without it you are defenseless against the chronic assault that you're receiving daily from your phone, other wireless connections, and the numerous cell towers in our environment. I guarantee that you will be enlightened and that you won't be disappointed.

With that being said, cell phones and their associated dangers remain a controversial issue. And, while most conclusions in this book are derived from credible insiders and scientific experts in the field, as a precautionary measure, it's imperative to state that the opinions and reasonable conclusions expressed by the author of this book may not reflect those of the publisher, wholesalers, distributors, and/or retailers.

CHAPTER 1

Where the Dark Deception Lies

According to the Cellular Telecommunications Industry Association (CTIA), at the end of 2006 there were over 224 million cell phone users in the United States.[1] Today that number has soared to more than 255 million.[2] What's even more phenomenal is the fact that, of the 6+ billion people on this planet, over one-third of them owns a cell phone and pays for service![3] There's no denying that the technology by which these phones operate is tremendous, or that the convenience and freedom they offer is beyond measure. Cell phones are wonderful and provide us with numerous benefits, but at what cost?

Over the past 24 years, cell phones have transformed dramatically. They began as bulky, "emergency only" bag units and they were unreliable. Furthermore, the geographical coverage was spotty. Yet, sales flourished. Today cell phones are no longer considered "emergency only" devices as initially intended and it's no longer uncommon to see 3 out of 5 people pressing a mobile phone to their ear, talking about anything and everything under the sun…whether or not the topic of discussion is important. Through industry design and promotion, they are now considered "must have" possessions; highly sought-after commodities of the modern age.

---

[1] *Insurance Information Institute*, http://www.iii.org (2008)

[2] CNN News, "Is There a Link Between Cell Phones and Cancer?", Larry King Live, 27 May 2008.

[3] Nystedt, Dan, "U.S. Marks New Cell Phone Record in 2005,". *IDG News Service*, 7 April 2006.

Today's phones are sleek; small enough to fit in your pocket, and capable of multiple functions. Aside from making a call, you can also access or accomplish any of the following: date book scheduling; download music; surf the Internet; send and receive text messages and email; take pictures and play games; record video footage; obtain navigational directions; and even watch television. Likely for these reasons alone, nearly every person over the age of 13 owns a cell phone. Those who don't are bound to feel the sting of social inadequacy.

However, since the popular device was first made available to consumers, cell phone users have questioned its safety. And though skepticism and controversy have continually challenged the wireless wonder, our growing attachment makes us quick to dismiss any negative information associated with its use, in favor of embracing that which is positive. Cells phones have become such an indispensable necessity that we yearn to believe they are safe.

Cell phone users are not the only ones who want to believe in cell phone safety. The industry, its manufacturers, and its service providers also want to convince you that their products are safe, primarily because they rely on close to $250 billion dollars in sales and service revenue each and every year. They've gone to great lengths to persuade you to accept the very notion of safety and continue to do so. They influence you in a variety of ways. They tell you what you want to hear and they keep the rest a secret.

This book is aimed at uncovering the deceptions and mysteries that have been taunting cell phone users for years. Your cell phone is probably important to you and you have grown dependent on it. You use it frequently and my guess is that you and your phone are literally attached at the hip. Let's face it, after reading this book, regardless what you learn, you're not going to give up your cell phone. Nor would I expect you to.

However, what will transpire is a deeper understanding as to (a) how cell phones operate; (b) how safety guidelines are established; (c) the role of the U.S. government in protecting its citizens; (d) industry regulatory and informational sources; (e) the results of worldwide cell phone related studies; and (f) the serious health hazards associated with wireless radiation exposure. You will also learn how to be smarter about using your cell phone; how you can easily protect yourself from unnecessary radiation exposure; and about how you are being deceived into believing that which is not true.

Deception *n.* the act of being deceived; to make a person or a group of people believe that which is not true; to intentionally mislead.

Deceptions are beliefs which are imposed with the deliberate intent to mislead or manipulate the truth. This type of dishonesty is often employed in order to change individual or group thought processes, actions, decisions, and behavior. Methods of persuasion can be verbal, nonverbal, or passively subtle, but whatever technique is implemented, the objective is always the same: to influence your belief system and cause it to fall in line with someone else's.

Unspoken persuasions and manipulations are often much stronger than those that are spoken or written. Subliminal messages like these can sneak into the subconscious, where they are often unknowingly and unwillingly accepted as truth. In other words, fiction is blindly embraced as fact when such a powerful belief system is imposed. You buy into it without question or realization of its acceptance and, while some deceptions pose no harm, others have dire consequences.

Deception Stems from Multiple Assumptions

Although the title of this book implies a single deception, there are actually many deceptions revolving around one core delusion - that cell phones are safe. The following misconceptions and deceptions seem to be most prevalent:

1. Cell phones are safe, with only a few exceptions.
2. Cell phone studies show no adverse health effects. (These studies, however, are typically conducted and funded by the cell phone industry.)
3. If cell phones are dangerous they would have never been mass marketed for consumer use and they wouldn't be as popular as they are today.
4. If cell phones are dangerous the government would surely protect its citizens from harm.
5. The only illnesses that have been remotely linked to cell phone use are brain cancer and brain tumors, and such incidents are rare.
6. Only chronic, abusive cell phone users are susceptible to health hazards; casual users are exempt.

7. If cell phone dangers truly existed the public would surely know.

As you will soon learn, what the majority of cell phone users believe to be true, isn't. Most of the information that makes up the foundation upon which these assumptions are based is secretly and intentionally hidden from consumers. It's time these truths were revealed and the facts disclosed. But the question is: Do you *really* want to know?

While discussing the topic of this book with family and friends, several cautioned that cell phone users wouldn't want to know the truth about cell phones and their related dangers. Conversely, others have sincerely thanked me for the information, saying that their eyes were opened and that they appreciated learning the truth, even though it wasn't what they wanted to hear.

Which category do you fall into? Do you really want to believe that cell phones are safe, even if they aren't? Do you want to allow yourself to be deceived or do you want to discover the truth? I firmly believe that knowledge is power and in order to be empowered, you have a right to know everything that I've learned over the past several years, even if you don't like it or agree with it. Discretion will protect you and understanding will guard you.

The Industry's Belief System

In his book, *Cellular Telephone Russian Roulette*, Dr. Robert Kane, a former Motorola engineer and a 30-year veteran of the telecommunications industry, proclaimed that, since the introduction of cell phones in 1984, the industry has developed and has instilled within us a "belief system," which has led us to accept the misconception that their phones are safe.[4] Cell phones would never be as popular as they are today if it wasn't for the industry's deep conviction, powerful persuasion, and ability to effectively impose their system of belief upon us.

Never in any multi-billion dollar cell phone media campaign has there ever been any mention of health risks, perceived or otherwise. The only observable risks derived from industry advertising are that you may not have enough minutes to talk as much as you want to or that your family might not have enough

[4] Robert Kane, *Cellular Telephone Russian Roulette* (New York, NY: Vantage Press, 2001), p. 191.

phones to go around. The greatest risk of all is that you will be a social deviant if you don't own a cell phone. Sadly, this last hazard has effectively led millions of children, tweens (8-13), and teens into the fraudulent perception of threatened social acceptability. Ironically, cigarettes were marketed in this same manner. By smoking, one gained social acceptance and prestige; by choosing not to smoke, one would be put down, teased, or shunned.

To have an effective marketing strategy, the power of persuasion can best be implemented through frequency and repetition of impression. By repeatedly running the same ads or different ads with the same message over a long period of time, audiences are easily influenced. For a campaign to be successful, prospective consumers have to buy into and accept that which they are being "sold" and with enough financial support, this can easily be accomplished regardless of what the advertiser is selling - a product, service, concept or idea. Service providers like AT&T, Verizon, and Sprint usually concentrate on selling bigger and better calling plans, offering a greater number of monthly minutes. In doing so they're promoting the belief that it's okay to talk on your cell phone for that much time each month. What isn't said, but implied, is that you can do so without any risk of harm.

Likewise, by persuasively marketing family plans, the industry promotes the belief that it's just as safe for children to own and operate cell phones as it is for adults. And since these ads are intentionally designed to target both parents and children, parents are provoked into action, while their children are simultaneously prompted to request and eventually beg for the device that will elevate their popularity status. What the ads don't disclose is that multiple studies have shown that, because their brains are still developing, children and teens are much more susceptible than adults to the risks associated with microwave radiation, which is being deposited and absorbed more rapidly into their brains during cell phone use. To this day, the majority of Americans remain completely unaware that everything they are told about cell phones here in the U.S. is either industry promoted or industry approved. No opposing viewpoints are ever expressed because the government has given the telecommunications industry the authority and the undeserved right to govern itself.

Furthermore, no government funding is allocated for objective research. This effectively empowers the industry to suppress any potentially damaging information. While most

Americans rely on the media for accurate news and information, when it comes to cell phones, they are ignorant to the fact that the industry is the primary source feeding them their data. In essence, the media also plays a role in misleading the public.

In situations where an unbiased voice of truth is absent, consumers can become like sheep - easily led astray. You probably have no idea that researchers and experts in the field of electromagnetic radiation (EMR) and radiofrequency microwave (RF/MW) radiation, which is emitted from cell phones, perceive the cell phone industry as towing the same line the tobacco industry once towed. Only in this instance, they worry that the loss and destruction of life due to the former may exceed the latter. Even more important to consider is that it took over 100 years to gather enough scientific evidence for industry authorities to require the placement of warning labels on cigarette packages.[5] It is for this reason that I long to be a voice of truth in the issue of cell phone safety.

The Birth of Deception

When cell phones first became available for consumer use in 1984, they were widely embraced. Although there was little concern for safety at the time, the assumption was that they must be safe in order to be sold to the general public. It wasn't until 1993 that deception was deliberately birthed.

The cellular industry was hit with its first cancer lawsuit, which came as a complete shock to all cell phone users, and the negative publicity made the industry nervous and very defensive of their position on safety. The public's fear escalated, as did their health concerns, and cell phone stock began to plummet. But, instead of recognizing the incident as a possible red flag or as a warning of serious health issues to come, the industry panicked and focused solely on saving its reputation and protecting its assets.[6]

On ABC's 20/20 news broadcast, Paul Staiano, President of Motorola General Systems, responded to the accusations that cell phone use can cause cancer with a ridiculous exaggeration. He proclaimed that, "Forty years of research and more than 10,000

[5] George Carlo and Martin Schram, *Cell Phones: Invisible Hazards of the Wireless Age* (New York, NY: Carroll & Graf Publishers, 2001), p. 243.
[6] Ibid. pp. 6-9.

studies have proved that cellular phones are safe."[7] In an effort to provide evidence that this was in fact a true statement, the industry scrambled to compile documents that seemed to prove cell phone safety. Initially the studies presented appeared to be legitimate, but a closer look revealed that most, if not all of the data brought forth was derived from outside of the cellular frequency; not at all what cell phone users are exposed to. Therefore, the assertion that "more than 10,000 studies" proved safety was unmistakably invalid and clearly deceptive.

Because the media accepted the industry's statement as factual and publicized its claim without any evidence of validity, it wasn't long after the illegitimate news was released that public health concerns subsided and consumers experienced a newfound freedom to use their cell phones without fear of harm. After all, that's what every cell phone owner wanted to believe, that their phone was safe.

Following the 20/20 episode, Louis Slesin, editor of Microwave News and frequent industry safety critic, joined with others who accused the cell phone industry and its trade organization, the Cellular Telecommunications Industry Association (CTIA), of exaggerating research that supposedly supported claims of safety. An FDA official even went so far as to reprimand both the CTIA and the industry "for suggesting that enough scientific evidence exists to support the conclusion that cellular phones are safe". [8]

Consequently, by the time the truth was finally uncovered, the media exposure was remarkably less than that of the fraudulent safety statement previously made by the industry. Although the updated, more accurate information was undeniably controversial, it was definitely newsworthy, yet the message was never conveyed to the public. Why was it so easy for this information to be swept under the rug? Considering the history of publishing and advertising practices, the answer to that question is simple: Money, or rather, advertising revenue. If up to two-thirds of your income was derived from one key source, how likely would you be to destroy that relationship by exposing their faulty products and hindering the continued growth of their business? To do such a thing would be like slitting your own financial throat.

---

[7] Goldberg, Robert, "The Cellular Phone Controversy: Real or Contrived?," *EMF Health Report,* Vol. 1, No. 1, 1993.
[8] Keller, John, "Are They Safe?," *Wall Street Journal*, February 11, 1994.

Think about this for a minute. When you're watching television, reading the paper, surfing the Internet, or listening to the radio, you are constantly hammered with advertisements from five top industries: automotive; pharmaceutical; insurance; food service; and cellular service, not necessarily in that order. These advertising budgets equate to millions of dollars in media revenue annually, and, as we all know, money talks. The bigger the budget, the louder the voice. Recognize that each of these advertisers has substantial influence over the media venues with whom they choose to invest their billions.

This realization helps answer one of today's most prevalent questions which will be addressed further in the next chapter: "If cell phones are dangerous, why don't you know about it?"

A Reconciliation Attempt

After being caught in the lie that greatly deceived the American people, the wireless industry expressed regret over hastily claiming the untruth of cell phone safety as fact in a futile attempt to ensure self-preservation. As a follow-up effort to save its reputation and that of its products, the CTIA, the trade association representing cellular telephone service providers, hired the Wireless Technology Research Group (WTR) to conduct research on cell phone health and safety. Dr. George Carlo, director of WTR at the time, was to be paid up to $25 million dollars, over a three to five year period, to appease the public's uncertainty regarding any health concerns related to cell phone use. This was to be the world's largest research effort into wireless safety, during which Carlo was to prove once and for all that cell phones are not dangerous.

In the book, *Cell Phones: Invisible Hazards of the Wireless Age,* Carlo discloses that during his stint of employment with the WTR, he and his team conducted extensive research for the CTIA. Carlo believed the CTIA was confident that they had chosen someone to lead the research who could be won over if a situation should ever arise. But Carlo, a 39-year-old public health scientist, specializing in epidemiology from the George Washington University School of Medicine, was dedicated to acquiring the truth. He took his position of authority very seriously.

On December 3, 1998, Carlo reported to the CTIA that "it as unlikely that their mobile phones would cause health problems," but just 18 days later, that statement no longer held true.[9]

[9] George Carlo and Martin Schram, *Cell Phones: Invisible Hazards of the Wireless Age* (New York, NY: Carroll & Graf Publishers, 2001), pp. 14, 9, 149.

CHAPTER 2

The BIG Question

"If Cell Phones Are Dangerous, Why Don't You Know About It?"

There are some very valid reasons why you remain unaware of cell phone dangers associated with use. One is due to the fact that scientists and professionals in the medical and health industry don't see eye to eye on the issue of cell phone safety. Based on scientific knowledge, scientists understand the attributes of RF/MW energy and how it works. Likewise, health and medical experts base their opinions on knowledge relative to the medical field. Health experts focus on observing and evaluating how RF/MW energy interacts with and impacts the human body. In this way, they are better able to determine whether a danger or threat exists and what needs to be done in order to secure public safety. Both groups play an essential role, yet, because they approach the issue from differing viewpoints, they rarely share the same opinion.

Another reason it has been so difficult to arrive at a definitive answer to this question is that, even though experts review the same studies, they interpret the results differently. While many strongly believe that there is more than enough evidence to prove that adverse health effects exist from cell phone use, others are unwilling to admit any risk. The cause of this discrepancy is due to the fact that similar studies have not all arrived at consistent and identical outcomes. When assessing risk, some experts accept the results of short-term studies. Others however restrict their

philosophies to only that which is derived from long-term, chronic exposure studies, of which there are few.

Additionally, some experts only take into account the effect that RF/MW radiation has on average, healthy people of median age, exempting those who are more vulnerable, such as those in poor health, children, pregnant women, and the elderly. This method of evaluation is inconceivable, not only because everyone has the right to be healthy and live quality lives, but because evaluation results cannot help but be skewed. Furthermore, now just about everyone on the planet has been exposed, so there is no longer a control group (those who have had no exposure) from whom the effects can be measured. Indeed, it would be extremely difficult, if not impossible, to conduct any type of long-term study of cell phone safety that would give an accurate account of how society is really being impacted.[10]

And last, but not least, the cellular industry is its own final authority and has ultimate control of whether the results of industry-funded studies, which make up the majority of research conducted in the U.S., are released or withheld from the public.

Who Are You Supposed to Believe?

Now that you understand why there is so much controversy among experts, let's move on to another pertinent question: "Who are you supposed to believe?" While considering this question, do you agree that inquiring information from a person or entity that has no third-party or monetary interest in the answer provided is the key to ascertaining the truth? Should you place your trust in those willing to share knowledge without hidden agendas or ulterior motives? Do you concur that it's always best to formulate opinions based on information provided by multiple independent sources, rather than on a few subjective ones? If you answered yes, permit me to assure you of two things.

First, that this book was written by such an individual; an informed, yet independent third party, who has been seeking the truth for her own benefit and who desires nothing more than to share what she has learned with you, because you have a right to know. My only motive is to help you discover the facts about cell phone radiation exposure and to assist you in obtaining real answers, which

[10] Sage, C., *The Bio Initiative Report,* http://www.bioinitiative.org/report/docs/section_1.pdf (May 2008), p. 5.

will enable you to make wise decisions about your cell phone use, your health, and your future.

Second, that since most cell phone users are extremely skeptical and moderately sensitive about the subject of cell phone safety, this book relies on a compilation of information derived from multiple worldwide research efforts. The studies which will be shared with you have been conducted by an extensive array of extremely reliable and credible sources. These sources include, but are not limited to, various government agencies, highly respected and world-renowned scientists, biophysicists, epidemiologists, medical professionals, activists, scholarly individuals, and concerned organizations from all over the globe. Their discoveries will most certainly enlighten you, they may even shock you. Either way, their insight will provide you with enough evidence from which to draw your own conclusions concerning cell phone safety, or lack thereof.

Scientist Clas Tegenfeld, has studied the biological effects of electromagnetic fields (EMF) for years and he declares that, "already there are at least 15,000 scientific reports on the subject." While cell phone users are being told that not enough studies have been conducted and that there is no proof of harm, it is a known fact that cell phone radiation falls within the spectrum of electromagnetic radiation (EMR). Therefore, the effects are often similar. Tegenfeld feels that these studies offer more than enough scientific evidence to indicate risk. However, he is convinced that the findings are not being reported to consumers, because, "I'm afraid the truth is that we don't want to know". [11]

Dr. Neil Cherry, a leading physicist at Lincoln University in Canterbury, New Zealand, agrees, stating, "Strong claims by industry representatives and their consultants that there is no scientific evidence to justify the public's fears is scientifically, demonstrably wrong." In his numerous dose-response studies, Dr. Cherry proved that EMR exposure, such as the exposure from cell phones, is genotoxic, causes cancer, and has adverse health effects on the cardiac, reproductive and neurological systems. After extensive work in this field, he has concluded that the only safe level of RF/MW radiation, which is emitted from cell phones, cell phone towers, and other wireless connections, is *zero*![12]

---

[11] Begich, Nick and Roderick, James, *Earthpulse Press, Inc*., "Cell Phone Convenience or 21st Century Plague?," http://www.earthpulse.com/products/cellphoneplague.htm (July 2004).

[12] http://www.mapcruzin.com/radiofrequency/cherry/neil_cherry1.htm (2008).

Likewise, Dr. Robert Kane, who spent 30 years working in the telecommunications industry and has a Ph.D. in Electrical Engineering, calls attention to revelations that have been established over a 45-year span. Between 1950-1995, there has been confirmed, solid evidence proving three truths about cell phones and those who promote their use. The first is that cell phones expose operators to dangerous and highly destructive levels of radiofrequency energy, which is bodily absorbed. Second, cell phone manufacturers, service providers, governments, and scientists have long been aware of the hazards. And finally, that the previously mentioned entities have not warned cell phone owners of the hidden dangers.[13]

These yet to be disclosed statements may be difficult to accept, but if all of these statements are true, the original question: "If cell phones are dangerous, why don't you know about it?" remains.

The Government's Role

It may surprise you to learn that, prior to cell phones being mass marketed to the general public, there was never any government mandated pre-market testing to certify that they were safe to use. Pre-market safety testing by the FDA (Food & Drug Administration) is mandatory for every consumer product that will be purchased and utilized in the U.S. Food, drugs, beauty products, children's toys and any other item distributed to the general public must be safety tested and approved prior to its release. But for some obscure and questionable reason, cell phones were neither tested nor scrutinized to ensure safety prior to their release. Without any safety assurances whatsoever, the U.S. government gave the cellular industry the "green light" to sell their radiation-emitting devices to unsuspecting buyers; a trusting population that assumes adequate government protection.

In the book, *Cell Phones: Invisible Hazards of the Wireless Age*, Dr. George Carlo, chief scientist of the world's largest research effort into wireless safety, expressed frustration with the government's decision. He was appalled to realize that in the year 2000, with over 100 million cell phone owners in the U.S., the government had still done nothing to protect its citizens from the hazardous risks that remain secret from the public. Now, with over

[13] Robert Kane, *Cellular Telephone Russian Roulette* (New York, NY: Vantage Press, 2001), p. 40.

255 million cell phone users in the U.S., your safety continues to be jeopardized, as cell phones remain an untested and unregulated consumer product.[14]

The Federal Communications Commission (FCC) is a licensing and engineering agency that oversees the development and use of communications technology. It does not test, fund, or conduct research on cell phones, cell towers, or the microwave radiation emitted from them. The FCC relies on the cellular industry to govern and monitor itself for compliance. Moreover, the FCC admits that it does not have the knowledge or expertise to determine radiation exposure guidelines for safety. Therefore, they have entrusted three independent engineering organizations - the Institute of Electrical and Electronic Engineers (IEEE), the American National Standards Institute (ANSI), and the International Commission on Non-ionizing Radiation Protection (ICNIRP) – to determine safe exposure levels for the nation. [15]

Quoting an FCC official in 1994, the Bloomberg News Service confirmed the previous statement: "The FCC is not in the business of doing basic biological research to ascertain how cell phones might affect the brain." Dr. Robert Cleveland, cellular biologist and former director of the FCC's office of engineering and technology, also established the agency's disregard in the area of research and testing by saying, "We (the FCC) don't have the authority to do that sort of thing. The FDA is more in line to do that kind of thing."

However, later that same year, the FDA did mandate the FCC to require all cell phone manufacturers to certify that their products meet safety standards. But again, no government agency or authoritative entity oversees or ensures that cell phones actually do adhere to those definitive certification requirements. The government simply trusts manufacturers to fulfill that obligation. By the same token, the FDA also admits that it does not review or test any radiation-emitting devices, such as wireless phones, for safety. Not only does the FDA not test radiating-emitting devices, but they admit

[14] George Carlo and Martin Schram, *Cell Phones: Invisible Hazards of the Wireless Age* (New York, NY: Carroll & Graf Publishers, 2001), p. 77.

[15] Brown, Gary, *Wireless Devices, Standards, and Microwave Radiation in the Education Environment,* http://www.emfacts.com/wlans.html, (October 2000).

to having no regulatory authority to require manufacturers to conduct long-term product studies in order to ensure long-term safety.[16]

An Opportunity to Alert the Nation

In the summer of 2000, Dr. David Feigal, the FDA's Chief of the Center for Devices and Radiological Health, appeared on the CNN news program, *Larry King Live*. This branch of the FDA is a consumer watchdog that's responsible for alerting the public of suspected threats whenever they arise. According to Dr. George Carlo, just seven days earlier Feigal's agency hosted a conference, during which Motorola's scientist, Dr. Joseph Roti Roti revealed his most recent findings. Roti Roti informed the FDA and others at the conference that cell phone radiation caused genetic damage to human blood cells. But instead of sharing this deeply concerning information with King's millions of viewers, Feigal chose to side with the industry in misleading the public into believing that cell phones pose no health risk.[17]

In a letter dated January 16, 2001, Feigal commented: "We don't have the money to protect consumers from wireless technology".[18] With that being said by an insider, it clearly establishes the fact that neither the FCC nor the FDA is sufficiently protecting the health and well-being of American citizens. Coincidentally, this observation was reiterated later the same year inside the walls of a Louisiana Federal District Court, when it was concurred that the public could not depend on either FCC or the FDA for protection against RF/MW radiation exposure.[19]

Who Governs the Giants?

With no government safety assurances in place or funding available for objective, third-party research, you are in an extremely vulnerable position. By default, you are left to rely on a biased, subjective industry that feeds on your ignorance for their economic

---

[16] George Carlo and Martin Schram, *Cell Phones: Invisible Hazards of the Wireless Age* (New York, NY: Carroll & Graf Publishers, 2001), pp.78-80.
[17] Ibid. pp. 229-230.
[18] Silva, Jeffery, "FDA Ill-Equipped for Health Issue," *RCR News*, February 19, 2001.
[19] Brown, Gary, *Wireless Devices, Standards, and Microwave Radiation in the Education Environment,* http://www.emfacts.com/wlans.html, (October 2000).

livelihood, to ensure your safety. To your detriment, there has never been any organized opposition to refute these political decisions. This wrongful exchange of authority has empowered the cellular industry to deceive you into believing whatever it is that they choose to tell you about their products and service. They, after all, are their own final authority.

Why Are There So Many Contradicting Reports?

The answer to this question can be narrowed down to three key elements: industry control, industry preservation, and global truths. Inconsistencies develop when industry control and preservation collide with global truths. As you can well imagine, the cellular industry does not want conflict or questions from the public or the media regarding the safety of cell phones.

Whenever industry funding *is* made available and industry researchers present unfavorable results, funding is often cut and all supporting documentation is conveniently destroyed. This is why there is such a small number of negative reports emerging from the U.S. Few researchers are willing to stand up to the cell phone industry and jeopardize their livelihood. They are fully aware that they could be fired or discredited for not providing their employer with the results they paid for.

To further insure industry control and preservation, other protective measures are taken when scientific evidence proves harm or initiates controversy. Any threatening news that cannot be contained prompts CTIA representatives to "spin the truth" to their advantage. This has long been an effective way to hold public relations to specific standards. Anything derogatory is rejected and depicted as fictitious, rather than fact, when thought to have damaging effects.

Hollywood celebrities, politicians, and large corporations, including both the tobacco and cell phone industries, all hire public relations professionals to employ these influential, image preserving techniques when necessary. According to insider Dr. Kane, CTIA seminars even go so far as to, "teach cellular industry people how to wage the public relations battle for the minds of the public".[20] Doing this enables them to consistently maintain and project their belief system of safety to consumers. Reports that contradict the

[20] Robert Kane, *Cellular Telephone Russian Roulette* (New York, NY: Vantage Press, 2001), p. 234.

information received from the industry generally come to U.S. consumers from other countries.

Industry Concealment

As previously mentioned, the WTR, operating under the direction of Dr. George Carlo, was established by the industry (CTIA) in 1993 to conduct independent research to prove safety. However, within a relatively short period of time during which numerous studies were conducted, there arose serious reason for concern. Because the findings were so disturbing, studies were repeated, but even varied techniques produced similar results. To insure validity, three groups of world-renowned scientists had the studies peer-reviewed by independent experts. After much scrutinizing, the WTR confirmed that cell phone radiation causes genetic changes in human blood cells.

It has long been widely recognized and accepted that all tumors and cancers are the result of genetic damage. This same kind of damage resulted when human blood cells were exposed to wireless signals from all types of phones: analog, digital, and PCS. Following exposure, there was also evidence of multiple cells with micronuclei in the human blood. The development of micronuclei (many nuclei, rather than one nucleolus) in the blood is one of the best indicators of cancer risk, as well as other health hazards. It identifies cells which are no longer able to repair their broken DNA.

At current exposure levels, cell phone users remain particularly vulnerable to these hazardous developments.

Those at the WTR were alarmed by the findings and as you can imagine, the news did not sit well with industry leaders. Following his research, Carlo immediately addressed the CTIA about devising a new, more realistic safety exposure standard for radiation emissions from cell phones. He informed Jo-Anne Basile, vice president of the CTIA, of the crisis, telling her that it was shameful and that the industry was failing to meet its public health responsibility by willfully exposing cell phone users to harmful emission levels. Reportedly, her response to him was, "How dare you talk to us like that after all the money you've been paid?"[21]

---

[21] George Carlo and Martin Schram, *Cell Phones: Invisible Hazards of the Wireless Age* (New York, NY: Carroll & Graf Publishers, 2001), pp. 6, 149-154.

After this, the WTR's research funding was cut. Researchers hired by the industry encounter complex situations when results challenge or negate the belief system of safety. Carlo was not alone in his efforts to definitively speak out about the adverse health effects that his research team discovered. Other experts in the field, including Dr. Ross Adey, Dr. Jerry Phillips, and Dr. Henry Lai, have also refused to be bought by the industry.

While working for Motorola, Dr. Ross Adey, one of the world's most respected and widely published RF senior researcher from the University of California, Riverside, had his funding immediately terminated when he revealed that mobile phone emissions significantly increased the number of brain tumors in animals. His research also reiterated the findings of many other studies proving that these same emissions cause DNA damage. Dr. Jerry Phillips, Adey's associate at the time, said that their working relationship with Motorola was pleasant prior to disclosing their conclusions. Afterward, tensions were stretched. Phillips asserted that, "Motorola was adamant that Adey never mention DNA damage and RF radiation in the same breath." [22]

The irresponsible decision not to disclose the truth about the impact their phones have on consumers was so disheartening that Adey chose to expose the truth of what happens inside the industry and how research procedures are inappropriately managed. He confessed that, "Motorola has been manipulative of research that we and others have reported to them. Essentially, they cut us off, because we were too inquisitive." Motorola was unwilling to hear, let alone accept anything derogatory regarding their phones.[23]

Phillips shared Adey's concern and likewise revealed Motorola's displeasure with their study's concluding report. He even divulged the fact that the manufacturer was looking for ways in which they could "spin" the findings to project them in a more positive light. These were not the kind of outcomes they had paid for or were looking to obtain. Therefore, Motorola was unwilling to accept what these leading experts had determined as fact. They even urged Phillips not to publish the results, but recognizing the incredible magnitude of their research, Phillips disregarded

---

[22] Fleming, "Cover-Up Claims Over Mobile Phone Danger," *Express Newspapers*, May 24, 1999.

[23] Begich, Nick and Roderick, James, *Earthpulse Press, Inc*., "Cell Phone Convenience or 21st Century Plague?," http://www.earthpulse.com/products/cellphoneplague.htm (July 2004).

Motorola's request and made known what was meant to remain secret.[24]

Then, there are Dr. Henry Lai's research findings to take into account. After 20 years of research for the industry, Lai, a top bioelectromagnetics researcher at the University of Washington, Seattle, and his colleague, N.P. Singh, observed DNA strand breaks in rats after they had been exposed to electromagnetic fields similar to those cell phone users are exposed to. Lai was quoted in the London Times as saying: "They are asking me to change my whole interpretation of the findings in a way that would make them more favorable to the mobile phone industry. This is what happened in the tobacco industry. They had data in their hands, but when it was not favorable, they did not want disclose it." [25] Instead they hid the truth, just as the wireless industry is doing.

Both doctors, Adey and Lai, are not unrecognized in the fields of microwaves and radiation. In fact, they are two of the world's leading scientific experts. They have both been involved in multiple research projects, including military ones, and their expertise concerning the health effects of EMF (electromagnetic fields) has been employed to increase the military's understanding of potential weapon applications. Thanks to their integrity and autonomy, we can trust their repetitive and firmly established findings.[26] And, even with their solid backgrounds in scientific research, both experts share similar working experiences when it comes to the inside operations of the cell phone industry.

Adey, Phillips, Lai, and others see a strong parallel between what is happening now and the decades of denial by the tobacco industry. Just as the tobacco industry withheld harmful information from the public, the cell phone industry is following suit. In fact, in a December 1994 internal Motorola memo, Motorola Inc. devised a plan to collaborate with the Cellular Telecommunications Industry Association (CTIA) and Wireless Technology Research L.L.C.

---

[24] Kelley, Libby, CWTI (Council on Wireless Technology Impacts), and EON International, DVD *"Public Exposure: DNA, Democracy and the Wireless Revolution",* 2000.

[25] Health Effects of Microwave Radiation (Western View), *http://www.Goodhealthinfo.net/radiation/health_efx_western.htm*

[26] Begich, Nick and Roderick, James, *Earthpulse Press, Inc*., "Earth Rising- The Revolution: Toward a Thousand Years of Peace," http://www.earthpulse.com (January 2000).

(WTR) to downplay any potentially damaging scientific findings on possible health risks from portable telephones.[27]

These are prime examples from three industry-hired research experts and their experiences which are indicative of what happens to industry-funded studies that evoke unfavorable results. “It's all about science, politics, and money, and not necessarily in that order,” says Dr. Louis Slesin, editor of Microwave News. “Henry Lai and N.P. Singh had the courage to buck the system, and they have paid dearly for that.” Lai and others say that funding from the industry can come with restrictions so oppressive they hamper scientific inquiry.[28]

When it comes to manipulating research, Joseph Hotchkiss of Cornell University has commented on the ease of changing undesirable or threatening industry conclusions. “A host of techniques exist for manipulating research protocols to produce studies whose conclusions fit their sponsor’s predetermined interests. These techniques include adjusting the time of a study (so that toxic effects do not have time to emerge), subtle manipulations of target and control groups or dosage levels, and subjective interpretations of complex data. Often such methods stop short of outright fraud, but lead to predictable results. Usually, associations that sponsor research have a fairly good idea what the outcome will be, or they won’t fund it.”[29]

Dr. Jerry Phillips sums up the truth of industry-funded research in these words, “To buy a study is to be sure that your billions of dollars are safe”.[30]

---

[27] Begich, Nick and Roderick, James, *Earthpulse Press, Inc*., “Cell Phone Convenience or 21st Century Plague?,” http://www.earthpulse.com/products/cellphoneplague.htm (July 2004).

[28] Harrill, Rob, “Wake-up Call,” *Columns*, The University of Washington Alumni Magazine, March 2005.

[29] Maisch, Don, “Mobile Phone Use: It’s Time to Take Precautions,” *Journal of the Australasian College of Nutritional and Environmental Medicine,* Vol. 20, No. 1, April 2001.

[30] Kelley, Libby, CWTI (Council on Wireless Technology Impacts), and EON International, DVD *“Public Exposure: DNA, Democracy and the Wireless Revolution",* 2000.

The Smoking Gun

Following the evidence that cell phone radiation has been repeatedly shown to cause DNA damage, "Dr. George Carlo, in his capacity as director of WTR, wrote a letter to the CEO of AT&T which has serious legal implications for mobile phone manufacturers who have claimed that there is no evidence for adverse health effects from mobile phone use. With the letter widely circulated in the industry, making *that* claim now could possibly expose them to litigation in much the same way as what happened to the tobacco industry, where it was shown that industry assurances of no evidence of hazards from smoking was a complete fabrication."[31]

Isn't it ironic that expert researchers who have been employed by the cellular industry for a number of years are comparing this cover up of truth to that of the tobacco industry? Consider the number of years and the hundreds of thousands of lives that were destroyed or lost, before the tobacco industry finally came clean. Even today there are commercials reporting that 1,200 people a day continue to die from smoking-related diseases.[32]

As with other carcinogenic exposures such as asbestos, lead paint, pesticides, and the like, it can take 25-30+ years of research before there is sufficient "proof" of harm. Consider the fact that 100 years passed, before a warning was mandated for placement on cigarette packs.

Due to this extended period of time, the link between cell phones and the associated dangers resulting from microwave radiation exposure may not be made known to the public until it's too late. What makes this sequence of events significantly worse than that of the tobacco industry is that it's not only cell phone users who are at risk, but everyone's health is being jeopardized. Hundreds of thousands of cell phone antennas and relay towers are spread across this great nation and every second of every hour of every day, they are constantly transmitting signals. This means that our bodies are chronically being assaulted by invisible beams of RF/MW radiation, and this unnatural, radiant energy is being absorbed into our bodies, causing serious health problems.

---

[31] Maisch, Don, "A Letter Bomb for the Mobile Phone Industry?," *EMFacts Consultancy*, October 19, 1999.
[32] *Truth ads*; http://www.thetruth.com (2008).

CHAPTER 3

A Desperate Search for Answers

Our catastrophic, life-changing story began in November 1995. At the age of 36, my late husband Steve was finally convinced to visit a doctor. He had been dealing with chronic headaches for months and had been downing aspirin as if they were candy. As with most people, for lack of a better explanation, Steve quickly attributed his excruciating headaches to work and stress. Blurred vision, nausea, insomnia, fatigue, ringing in the ears, anxiety, memory loss and confusion soon accompanied his headaches. Mood swings, irritability, and depression just as eagerly joined in. When the pain became too intense in March of 1999, my spouse of 15 years was no longer able to work; he spent most of his time in bed.

By 2001, Steve had seen more than 30 different doctors, neurologists, and specialists, all who had tried to help, but failed. Numerous tests had been initiated and various drugs prescribed; yet no relief was found. Steve remained sick, undiagnosed, and unsure of the path his life was taking. His symptoms were unrelated and made no sense whatsoever to any of the experts we met with. Within a relatively short period of time, each would inevitably reach a point of frustration where they were no longer able to offer any suggestions, prescriptions, direction, referrals, or hope.

The drive home after these particular doctor visits was always silent. Tensions were high and our level of aggravation mounted. It became increasingly apparent that if we were going to get any answers *we* would have to find them ourselves.

It was after yet another one of these disappointing visits that I could no longer remain silent on the ride home. We had been through so much, but I was not willing to give up without a fight.

Steve on the other hand, faced the daily struggle of just trying to cope and, after 6 long years he had little fight left in him. He was understandably tired and ready to surrender. I however, was unwilling to allow him to accept defeat. I looked intently at my partner in pain and began shooting off rapid-fire questions at him.

One right after another I fired flaming arrows of interrogation his way. The inquiries were all about the job he had held for the past 16 years. I persistently demanded to know everything: what he had done and how he done it; what kind of chemicals, products, or other dangerous toxins he'd been exposed to; and anything else he could remember. I was sure that if we were able to target some potential causes of his illness, we could make some sort of connection. In doing that, we'd be able to get Steve some desperately needed help. I knew very little about his job; he was restricted from talking about it and I had only been inside his workplace once, on Visitor's Day. Knowing that he had been issued top security clearance for his important position didn't hinder me from proceeding in the least bit. After all, I wasn't searching for top security information. I just wanted to know what was destroying my husband.

I was determined to learn why he continued to suffer from chronic and debilitating headaches, years after leaving work. I wanted to know why no medical professional could assist and why no prescription drug offered any relief. I wanted to ascertain why he behaved so erratically at times without being provoked. It was important for me to discover why, at age 42, he was so forgetful, why he was so frequently confused and disoriented, and why he was incessantly fatigued and depressed.

The Search Begins

Making sense of the answers Steve provided posed a definite challenge, because every word that came out of his mouth sounded foreign to me. He was spewing out terms like radiofrequency and non-ionizing microwave radiation, as if their meanings were common knowledge. With a deep sense of urgency I began an intense search on the Internet, using the phrase "radiofrequency non-ionizing microwave radiation", and in the advanced search field I typed in the exact phrase, "adverse health effects." It was baffling not only to see the number of results, but also that almost every one of them referred to cell phones and their related dangers.

Confused and irritated because that wasn't the type of information I was seeking, the search was deleted and repeated. Despite a number of attempts using various phrases, the results remained the same. I was certain that something was wrong with the search engines I was using, because "cell phone dangers" was not the category I was looking for. After all, I had owned a cell phone since 1989 and, to my knowledge, there had never been any proof of danger. I, like everyone else, believed they were safe.

The only potential danger I was aware of was the remote possibility that chronic cell phone use could cause brain tumors or brain cancer, but casual users were unaffected. Furthermore, evidence of this had never been substantiated.

But since multiple searches kept providing similar results, I chose to visit and read through some of the web sites, though the possibility of finding what I was looking for seemed unlikely. I figured it couldn't hurt.

I was soon surprised to discover that the information I had stumbled upon made a whole lot of sense. Among other things, I learned that cell phones utilize radiofrequency non-ionizing microwave radiation to transmit and receive wireless signals, clearly indicating a relationship between Steve's employment and cell phones. Specifically, the microwave power amplifiers that he had built and tested for years were being used in the base stations of cell towers all over the world. They were also being utilized to facilitate satellite communications, radar operations, and military weapon applications. All of these and other wireless communication signals operate using the same microwave radiation to perform messaging functions. As the pieces of the puzzle started coming together, I was eager to learn more.

Radiofrequency Microwave (RF/MW) Radiation

All wireless communication signals are transmitted and received using radiofrequencies of various power levels and wave lengths. What began with the wireless broadcasting of radio and television has exploded into an array of new technologies that have changed the world. Cell phones, cordless phones, pagers, radar, wireless Internet, and satellite communications all operate using different radiofrequencies at the microwave level.

Typically when one hears the term "microwave", they reference that which is most familiar: microwave ovens. That being

recognized, there are three principle differences between the microwaves used for wireless signaling and those used in microwave ovens: frequency, power, and heat. Although the microwave range is quite vast, these elements determine the characteristics of microwaves. For example, the series of frequencies at which cell phones operate span from 750 to 950 MHz (mega hertz). Microwave ovens however, operate at a much higher frequency of 2450 MHz. While microwave ovens use high frequency and high power, cell phones operate using high frequency and low power.

Heat is the third differentiating factor between the microwave radiation used to operate cell phones and that which is used in microwave ovens. While both of these devices elicit the same type of heat, that heat does not generate the same response. The RF/MW radiation used in microwave ovens produces an intense, detectable heat that cooks food. In contrast, the heat which is generated from cell phone microwave radiation is rarely perceived externally. Although it is powerful enough to cook, it does so from the inside out and rarely heats the surface. The heating effect from these microwaves takes place deep within the human tissue and goes undetected. This absence of heat presents us with another cell phone deception, as you will soon discover.

Unfortunately, to our detriment the latter heating concept is much more difficult to grasp. This is due to the fact that the deep tissue heating which transpires inside of the brain of a cell phone user from its microwaves is rarely felt on the skin's surface, where the phone is held. It's not until the microwave energy is deposited, absorbed, and converted into heat well below the epidermal layer that dangerous temperature increases take place and damage occurs. Temperature increases associated with absorption have been shown to occur within the first 60-90 seconds of exposure. In other words, after being on your cell phone for as little as 60 seconds, damage can start to take place. Even though you seldom feel warmth while talking on your phone, at the point where heat is detected, brain damage is already occurring. What's worse is that the brain has no pain receptors to warn you of the severity of such an injurious assault.

Without any heating sensation whatsoever, you may have trouble accepting the fact that cell phone microwaves have been proven to cook brain tissue much more quickly and efficiently than a microwave oven. Consider this: if it only takes 60-90 seconds of microwave oven radiation to boil one cup of water, and if cell phone

microwaves cook more quickly and efficiently, and your brain is 90% water, imagine what's happening to your brain after a 60-90 second phone call. [33]

Ionizing vs. Non-Ionizing Radiation

In order to fully comprehend the dangers posed by cell phones, cell towers, and other wireless devices, and to understand the basis upon which U.S. safety standards are established, it's essential that you be able to distinguish between the two types of microwave radiation - ionizing and non-ionizing. Ionizing radiation is made up of very short electromagnetic waves of very high frequency and is located at the upper end of the electromagnetic spectrum. This type of radiation is referred to as "ionizing" because its energy travels at such extremely high speeds that tightly bound electrons detach from their pre-existing union with atoms. This breaking of chemical bonds creates ions, or electrically charged atoms, which emit radiation.

Ionizing radiation exists naturally in the form of solar energy, cosmic rays, and radioactive elements found in the earth. This power source includes gamma rays; it has also been integrated into man-made applications such as x-ray technology and that which is used to generate electric and nuclear power. This form of radiation is universally recognized as being harmful and biologically interactive. Exposure penetrates the human body causing injury to living tissue, skin burns, and a variety of other adverse reactions including genetic damage and cancer.

Conversely, non-ionizing radiation is made up of longer electromagnetic waves operating at lower frequencies; these signals are weaker, therefore they reside closer to the bottom of the electromagnetic spectrum. Examples of non-ionizing radiation in sequence of power begin with low energy emissions from power lines, they include RF radio and television broadcast signals, and the high end is comprised of microwave ovens and microwave energy which is used to operate all forms of wireless communication. Since microwaves reside so close to ionizing radiation, their power has the greatest intensity of all non-ionizing radiation forms.

Like ionizing radiation, microwaves are made up of very short (micro) and powerful electromagnetic waves of high frequency, but they are not powerful enough to become ionized. Non-ionizing

---

[33] Robert Kane, *Cellular Telephone Russian Roulette* (New York, NY: Vantage Press, 2001), pp. 6, 12-14.

radiation in this upper range of the electromagnetic spectrum is generally referred to as radiofrequency microwave (RF/MW) radiation, cellular radiation, and electromagnetic radiation (EMR).

As previously mentioned, heat, power, and frequency are the attributes that determine the conduct of microwaves; their differences in these three areas have also been established. Therefore, it seems extremely unreasonable that microwave ovens are paired with cell phones on the electromagnetic spectrum when they are obviously poles apart.

In the developmental stage, cell phones were thought to be harmless because the only perceived dangers from microwaves were those associated with heating and cooking. Since pressing a cell phone against one's head doesn't cause any immediate burning sensation, discomfort or pain, the industry and those who determine safety standards presumed them to be safe. Scientists were also convinced that, while cell phones operate using low power and microwave ovens operate using high power, chances of any adverse health effects from cell phone use were slim to none. They even developed a synchronized understanding that unless radiation was able to produce internal temperature increases enough to elicit whole body heating there was absolutely nothing to worry about.

When it comes to cell phone safety, U.S. guidelines, which have been put into place for our protection from non-ionizing RF/MW radiation, continue to be based on these same preconceived notions. Standard setters continue to base safety on the outdated premise that, if radiant energy doesn't heat the entire body and raise internal body temperature, it can't be harmful. This principle has remained in effect even though science has repeatedly proven that non-ionizing microwave radiation causes deep bodily tissue damage from heating without raising internal body temperature. When it comes to safety, maintaining this archaic theory is irresponsible.

To enhance your understanding of the ridiculous foundation upon which our so-called safety standards are based, consider the following examples. If you hold your finger over a flame, it will begin to get hot and is likely to burn (adverse health effect). If you are out in the sun too long without protection, you are also likely to burn (adverse health effect). These adverse health effects (external burns) are likely to result without increasing your overall internal body temperature and, according to the premise upon which safety exposure standards are founded, if heating doesn't produce a total body temperature increase of at least 1˚ Celsius (equivalent to an

internal increase of 1.9° Fahrenheit), exposure can't be harmful. And, as with these examples of direct exposure, similar results occur from cell phone RF/MW radiation when holding the device up against the head. The undetected heat from the exposure is not evenly absorbed or distributed throughout the human body; therefore it is impossible to cause a total body temperature increase, yet exposure is proven to be harmful.[34]

These examples provide us with solid evidence which clearly substantiates that the foundation upon which the nation's safety standards are based is deceptive, misleading, and does not protect cell phone users from non-ionizing RF/MW radiation exposure or its associated dangers.

Even though studies have repeatedly shown that deep tissue heating from non-ionizing radiation can cause severe internal tissue damage, destruction of cells, and other adverse health effects without raising bodily temperature, the cellular industry would prefer you to believe that the previously cited notion is true. They are not interested in having you understand how safety standards have been conceived and how absurd they really are; instead they are banking on your trust and ignorance.

The Power of Cell Phone Radiation

RF/MW energy used to transmit communication signals to and from cell phones is extremely powerful. It has the ability to pass through just about any type of matter. When placing a call from wherever you are to whomever you're calling, your signal invariably has to travel through a multitude of objects. To make the connection, invisible microwaves infiltrate metal, glass, concrete, steel, and other seemingly non-penetrable elements. So it's not a stretch to acknowledge the fact that microwaves can just as easily penetrate skin, fat, tissue, and bone. Studies show that when handsets are held against the head, the RF/MW radiation emitted from them delves 2.0 to 3.8 cm (1.5 inches) deep into brain tissue, where it is absorbed and

[34] Melbourne, Alan, *"Radiation Protection Standard for Maximum Exposure Levels to Radiofrequency Fields – 3kHz to 300GHz,"* Chapter 4, p.5, http://www.aph.gov.au/SENATE/committee/ecita_ctte/completed_inquiries/1999-02/emr/report/c04.pdf , (March 20, 2002). U.S. exposure guidelines are similarly based.

efficiently heats to cook, damaging and destroying brain cells with every use.[35]

To my knowledge, there are only two exceptions to this rule of penetration. RF/MW signals such as those discharged from cell phones, towers, satellites, and the like are unable to penetrate lead or mountains. This is why you have undoubtedly experienced dropped calls while passing through mountain ranges or driving through hills.

This brings up another interesting point to ponder. When calls are being placed and received by those around you, the waves may actually have to travel through you in order to make the connection. Like second hand smoke, second hand RF/MW radiation exposure from cell phones cannot be contained by the user. Everyone in close proximity of the operator is involuntarily being irradiated, as microwaves pass through everything in their path to link the caller to the receiver. Exposure from other nearby wireless sources, such as Wi-Fi, cell towers, radar, and satellites, also poses serious health concerns.

Dangers resulting from these radiation-emitting apparatuses will be discussed in chapter 10 entitled, Tower Trauma.

Cranial Radiation Absorption

A well-respected group of scientists, working independently of each other, reached a similar conclusion about cell phone radiation absorption. Each reported that as much as 90% of the RF radiation emitted from cell phones is absorbed into the head of the user, instead of dissipating into the atmosphere.[36] There are four key elements that determine actual absorption rates. These include the phone's design, the antenna type, the way in which the phone is used, and the distance the user is from the nearest base station or cell tower.

Your phone's design plays a significant role in the amount of radiation that is absorbed into your head. Every phone has a SAR value that defines the phone's specific absorption rate (SAR). Phones manufactured with a lower SAR factor are supposedly safer than

---

[35] Polk, C., and Postow, E., *CRC Handbook of Biological Effects of Electromagnetic Fields* (Boca Raton, FL: CRC Press, 1986).

[36] Kuster, N., "Multiple Method for Simulating EM Problems Involving Biological Bodies," *IEEE Transactions on Biomedical Engineering* vol. 40, no.7 (July 1993), pp. 611-620.

those with higher SARs. SAR values will be adequately addressed in the upcoming chapter.

The antenna is the most dangerous part of your cell phone, because this is where microwave signals are transmitted to and from. Newer phones with built-in antennas are more dangerous than the older models, which were equipped with retractable antennas. Reason being is that built-in antennas cannot be pulled away from the head to reduce exposure. Instead, these more modern phones emit concentrated amounts of energy, not only from the antenna, but from the entire phone as well.

The way in which you use your phone also determines the amount of radiation that is absorbed into your head. Know that exposure and absorption can be reduced by keeping calls short; limiting the number of calls; holding the phone away from your head while connections are being made; using the speaker feature whenever possible; opting for text messaging or e-mailing; and employing the use of an air headset or another radiation-reducing device. By initiating any one or more of these techniques, you're sure to be better off in the long run.
Chapter 12, entitled Playing it Smart, discusses additional exposure-reducing recommendations.

Lastly, the distance between you and the nearest base station or cell tower also establishes your level of exposure and radiation absorption. The farther away you are from the nearest cell tower, the harder your phone has to work to make a connection. In other words, distance increases the phone's power, thus intensifying your rate of exposure. So, prior to making a call, especially if you're in a remote area, check your phone's signal strength. Signal strength is represented by the number of bars on your phone's screen. Weak signals indicate that you're far away from your service provider's nearest cell site. In these instances, before making or taking a call, it's best to wait for ample signal strength. This will help reduce unnecessary exposure.

The scientific truth that lies behind the distinctiveness of non-ionizing radiation, along with an understanding of deep tissue heating and absorption, can be difficult to grasp. After all, microwaves are invisible and there is no evidence of heat, pain, or discomfort while using your cell phone. What makes this concept even more deceiving is that the brain has no pain receptors. Therefore, even while it's cooking it elicits no warning signs of danger. And without any unpleasant sensations or proof of harm,

these issues make the facts look fake, thus misleading you into the illusion that cell phones are safe. The industry has it made in this regard. But please do yourself a favor and keep reading. You'll soon have evidence.

CHAPTER 4

Who's Protecting You?

With over 255 million cell phone users in the U.S, it's baffling that we as a nation remain unaware of the real dangers which have been linked to cell phone radiation exposure. Although a large percentage of cell phone users perceive some level of risk, most are convinced the devices are safe for the casual user. However, the definition of a casual user is constantly being redefined with usage increases. It is also assumed that reasonable government protection is in place.

Emission standard guidelines are parameters that have been established to protect the public from harmful microwave radiation exposure from all wireless communication signals. They are supposed to be set at a level whereby no adverse biological health effects are observed. Unfortunately, as you read through this chapter it will become evident that such objectives have not been met. The terms: 'safety standards', 'emission standards', 'exposure guidelines' and 'safety guidelines' are often used interchangeably to suggest recommended exposure limitations.

With exception of the U.K., the U.S. has the most liberal RF radiation exposure guidelines in the world.[37] In fact, U.S. radiation exposure levels are so high they have been found to be detrimental to the human body. Other countries, such as Sweden, Canada, Eastern Europe, and the former USSR, have restricted their allowable

[37] *Doesn't the FCC Standard Protect Us?,* http://www.goodhealthinfo.net/radiation/fcc_standard.htm (June 2007).

radiation exposure limits by as much as 1,000 times less than those set in the U.S.[38]

You may be wondering why there is such an international discrepancy. Why are Americans permitted to be exposed to so much more radiation than citizens of other countries? After all, don't all human beings have virtually the same biological makeup and aren't all wireless communication signals the same? Wouldn't everybody on the planet be affected in essentially the same manner? The answer is yes.

For years the World Health Organization (WHO) has been trying to adopt a worldwide safety exposure guideline and it has been a definite challenge, since there is such a vast inconsistency in current guidelines among countries. While some countries like the U.K. and the U.S. only recognize dangers at higher exposure levels, other countries are fully aware that dangers exist well below those levels. Since the U.K. and the U.S. have their standards set so high, for reasons you will soon understand, they refuse to reduce their exposure limits to comply with what the rest of the world considers safe. By contrast, countries that are familiar with the development of health hazards at lower exposure levels refuse to raise their limits to comply. They are unwilling to compromise and risk exposing their citizens to what they consider to be perilous conditions.

How Safety Standards Are Established

The chief methods used to determine safety standards of RF/MW radiation exposure in the U.S., as well as internationally, are deceptive. The information on ionizing and non-ionizing radiation provided in the previous chapter should assist you in understanding how U.S. safety standards come into existence.

National and international safety exposure guidelines are founded on five chief components: heating, absorption, short-term research, ignoring studies, and adverse health effects, none of which hold much validity.

---

[38] Robert Kane, *Cellular Telephone Russian Roulette* (New York, NY: Vantage Press, 2001), p. 119.

Heating

The dynamics and the effects of thermal radiation exposure in comparison to non-thermal radiation exposure are poles apart. However, the industry, government, and standard setters want you to believe that if, while using your cell phone, there is no sense of heating, then no harm will result. This "No Heat - No Problem" philosophy is extremely misleading; it's a deception, a flat out lie. The rationale behind it is widely accepted as the basis upon which to determine health effects and it is scientifically inept. All wireless communication operations use non-thermal RF/MW radiation. Therefore, setting exposure guidelines solely based on the premise of a heating and thermal response is absurd.

The standards which have been set in place for your protection are first and foremost devised to protect you from immediate, external thermal dangers, such as burns; this response from non-thermal microwave radiation exposure is highly unlikely. However, depending on its intensity, non-ionizing microwave radiation can generate a deep tissue heating response well below the skin's surface without ever being detected. If the body is able to compensate for and dissipate the heat load, there is little reason to believe that damage will take place. But if heating cannot be compensated for or previous damage is irreparable, further damage will result and possibly compound.[39]

Even as standard setters work to convince you that no harm exists without heating, it is important to recognize that very significant adverse health effects have been observed at non-thermal levels. Many even transpire at exposure levels far below the current safety guidelines and occur prior to any tissue heating. The non-thermal radiation exposure you are inundated with everyday, from cell phones and other radiation-emitting devices, have been found to produce a variety of biological and neurological effects. Some of these effects include abnormal brain activity; unusual and aggressive behavior; mood swings, reduced learning ability and performance; sleep disturbances; reproductive consequences; cancer; DNA damage; reduced immunity; hormonal changes; and cell proliferation. Therefore, a safety standard that only considers the heating effects of non-ionizing radiation is unrealistic…and irresponsible.

---

[39] Brown, Gary, *Wireless Devices, Standards, and Microwave Radiation in the Education Environment*, http://www.emfacts.com/wlans.html (October 2000).

Absorption

Safety standards are also founded on the assumption that the human body absorbs RF/MW radiation equally, but research indicates otherwise. Cell phone radiation does not irradiate the human body evenly; neither is it absorbed uniformly. If these statements were true, this criterion would make sense. But the truth of the matter is that some tissue has been shown to be more vulnerable than other tissue. Brain tissue, for instance, is extremely sensitive to high rates of RF/MW radiation absorption. Scientific researchers N. Kuster, O. Gandhi, G. Lovisolo, and V. Hombach all specialize in this field and agree that between 50% to 90%+ of the RF/MW radiation emitted from cell phones is deposited into and absorbed by the user's brain.[40] Eyes and breasts are also particularly responsive to this radiant energy. [41] Some organs and tissue located near the waist are likewise posed with an elevated risk of danger. The kidneys, the liver, and the testes absorb radiation more readily than other mid to lower range body parts.

An informational pamphlet accompanying every Verizon cell phone affirms this very point by stating that, "if the phone is mounted against the waist or other part of the body (head) during use (or while it's "on"), then that part of the body will absorb more RF energy."

Exposure guidelines also conclude that the human body can safely absorb up to 5 W/kg (watts per kilogram) of radiation before there is an internal temperature increase of 1˚ C (1.9˚ Fahrenheit). It is wrongly assumed that temperature increases below this level, cause no health problems.

To clarify this unrealistic concept, bear in mind the example given in the last chapter concerning whole body heating, tissue absorption, and distribution. Adverse health effects like pain and a burning sensation transpire after holding your finger over a candle flame for an extended period of time. But continued exposure will never be evenly distributed throughout the body, nor will it heat the entire body enough to produce an internal temperature increase of 1˚ C. This demonstrates how some forms of heat, including that of non-

---

[40] Robert Kane, *Cellular Telephone Russian Roulette* (New York, NY: Vantage Press, 2001), p. 8.

[41] Begich, Nick and Roderick, James, *Earthpulse Press, Inc*., "Cell Phone Convenience or 21st Century Plague?,"
http://www.earthpulse.com/products/cellphoneplague.htm (July 2004).

ionizing microwave radiation, are not evenly absorbed or distributed, but do still cause damage.

Different parts of the body respond differently to various doses of radiation exposure. This further demonstrates how concentrated amounts of RF/MW radiation aimed at particular bodily areas, like those previously mentioned, can significantly impact the tissue in those areas without affecting the rest of the body. The misconception that this type of radiation is equally absorbed and distributed also provides insight as to how inadequate, deceptive, and misleading the foundation upon which our so-called safety standards are based.

Short Term Research

Not only are national exposure guidelines established on the immediate hazards associated with heating, equal absorption and distribution of radiation, but the underlying data used to determine safety is derived solely from short-term exposure studies. Standard setters do not take into consideration the adverse health effects which have been shown to occur from long-term exposure to non-thermal RF/MW radiation, like those which can result after years of cell phone use.

Although multiple short-term research efforts have revealed and confirmed adverse health effects, very few people experience short-term exposure. Since RF/MW radiation is not limited to cell phone use, even those without the communication device are being irradiated with exposure from cell towers and other forms of wireless communication, such as Wi-Fi, cordless phones, satellite, and radar. Chronic exposure to this harmful energy invades the daily life of most people. It's just that the near-range exposure of radiant energy that is aimed directly into your head via your cell phone is more concentrated and more dangerous, because the human body is less able to compensate for such a close-range assault.

Ignoring Potentially Damaging Studies

In 1995, Dr. Ross Adey, a world renowned senior research expert in this area and a widely published RF researcher from the University of California, Riverside commented, "The laboratory evidence for a-thermal effects of both ELF (extra low frequency) and RF/Microwave fields now constitutes a major body of scientific literature in peer-reviewed journals (which scientists and attorneys rely on for proof of evidence). It is my personal view that to continue to ignore this work in the course of standard setting is irresponsible to the point of being a public scandal." "It is 'not a level playing field' in rejecting the evidence, in many cases peer reviewed and published, for non-thermal effects while uncritically accepting very questionable studies and claiming no effects were found. You can't have it both ways!" [42]

But instead of reviewing all of the available data and looking at the issue objectively, the FCC elected to side with industry interests, choosing which studies to consider and which ones to ignore.[43] Such an important decision regarding American's safety should be established only after conducting a thorough examination of all credible research and studies, not just a select few or those funded by the industry where the outcomes can be and often are pre-determined.

In 1999 the federal Radiofrequency Interagency Work Group (RFIAWG) of non-ionizing radiation experts issued a RF Guidelines Statement. RFIAWG is comprised of members in U.S. agencies including the FDA, NIOSH (National Institute for Occupational Safety and Health), EPA, OSHA (Occupational Safety and Health Administration), and NTIA (National Telecommunications and Information Administration). This federal agency group disagreed with the FCC when they maintained that their guidelines protected the public from harmful exposure. As mentioned earlier, there were a number of things that were never taken into account when safety guidelines were set.[44]

---

[42] Maisch, Don, *"Submissions to Standards Australia on Adopting the ICNIRP Radio Frequency Exposure Limits for Australia and New Zealand"*. "ICNIRP RF/MW Guidelines for Australia / New Zealand" Discussion paper (A), July 24, 1998.

[43] Robert Kane, *Cellular Telephone Russian Roulette* (New York, NY: Vantage Press, 2001), p. 141.

[44] Brown, Gary, *Wireless Devices, Standards, and Microwave Radiation in the Education Environment,* http://www.emfacts.com/wlans.html (October 2000).

Adverse Health Effects

In September 1999, theoretical physicist Dr. Gerard Hyland wrote the following in an appendix to the Minutes of Evidence, which was addressed to the British Parliament's Select Committee on Science and Technology: "Although the existing safety guidelines are clearly necessary, they are quite inadequate. For they completely fail to consider the possibility of adverse health effects linked to the fact that living organisms – and only living ones – have the ability to respond to aspects of technologically produced radiation other than its intensity, and, accordingly, can respond at intensities well below the limits imposed by the safety guidelines." [45]

While this statement was made regarding standards established in the U.K., the premise upon which it stands equally applies to the course of action taken in the U.S. The human body is electrical and it operates on electrical impulses, impulses which are influenced and affected by RF/MW signals. This external interference causes internal problems.

In the U.S., a number of animal laboratory studies were conducted in order to determine where safety standards for humans should be established. Researchers sought to find the lowest RF/MW radiation exposure levels that would elicit adverse behavioral effects and, since safety was presumably the ultimate goal, limits would have logically been set prior to observing *any* change in behavior.

However, instead of following logical criteria, industry scientists often waited until an animal's activity level dropped as low as 67% before recording any behavioral change (adverse effect). If standard setters were really interested in establishing safe public exposure limits, why would they wait until research subjects experienced such a significant decline in performance? Consider how even a 50% drop in your daily performance and ability would affect your job, your relationships, your lifestyle, and your overall quality of life. You would likely not be able to do half as much as you usually do and you'd probably only be able to do it half as well.

Clearly, each one of the five components upon which safety standards are based - heating, absorption, short-term research, ignoring studies, and adverse health effects - warrant delusions of protection. Rather than aggressively pursuing safety for American

---

[45] Petition for Inquiry of the EMR Network, Before the Federal Communications Commission, September 25, 2001, presented by attorney James R. Hobson, Miller & Van Eaton, P.L.L.C., Washington, D.C.

citizens, the FCC, along with standard setters, are knowingly and willfully allowing you to be exposed to levels of radiation that have been proven to alter behavior and cause harm. Guidelines based on false pretenses, such as those previously mentioned, continue to deceive the public into believing that cell phones are safe.

The rise in public health concerns, along with proof of non-thermal adverse health effects occurring at levels well below those which are considered safe, suggests that the government should make more of an effort to budget money for independent research. But since allocating funds to ensure public safety still hasn't happened in the U.S., some Americans might tend to believe what Norm Alster, writer for *Investor's Business Daily*, stated a decade ago: "With the government depending on revenue from operating wireless carriers, Washington is telling the public 'your health concerns don't count." [46]

Who Sets Safety Standards?

Who are the people setting these safety standards? Who do you rely on to keep you safe? Who are you trusting to make such important decisions on your behalf?

Most would consider it reasonable to assume that the people making health-related determinations about how radiant energy affects the human body are medical professionals or public health officials. But this is not the case.

Standard guidelines for public safety and exposure limits to RF/MW radiation emitted from wireless devices and their sites are not established by government agencies. Neither do those who hold any kind of medical or health-related degree determine them. Rather than recruiting knowledgeable, unbiased third-party individuals to design safety criteria on behalf of American citizens, the U.S. Government relies on three scientific organizations: the Institute of Electrical and Electronic Engineers (IEEE or "I-triple E"), the American National Standards Institute (ANSI or "an-see"), and the National Council on Radiation Protection and Measurements (NCRP). These organizations are responsible for issuing national guidelines, often referred to as the ANSI/IEEE standards, for adoption by the FCC. These guidelines set conforming parameters for the industry.

---

[46] Alster, Norm, "Newspaper Questions Whether Government has Considered 'Risks' of Wireless*", Investor's Business Daily*, May 29, 1997.

Since 1982, the ANSI and the IEEE have been the principal sources of expert advice to the FCC, regarding RFR (radiofrequency radiation), RF/MW exposure, and its related hazards.[47] The ANSI sets criterion standards for a multitude of unrelated electronic devices and the IEEE specializes in wireless technology.

The IEEE is a professional association made up of electronic engineers and physicists who are most familiar with the characteristics of radiation. Members of the IEEE have very close ties with the cell phone industry and the military. Is a matter of fact, an article published in *Microwave News*, a trusted trade journal which reports on industry happenings, disclosed that, "Standard setting bodies do more or less as the industry wants. Their members are often current, past, or future employees of the very companies they are supposed to regulate. Meanwhile government agencies have no appetite for confrontation".[48]

And although it's apparent that the IEEE standard setting committee is comprised of experts who know how to make wireless technology work, they are not experts in understanding how its radiation interacts with and affects the human body. A 2001 *Microwave News* editorial recognized this problem stating, "The Pentagon's new microwave weapon has been brought to you by…the same organizations that control the IEEE's SCC-28 committee that writes the standard for exposures to RF and microwaves….It seems obvious, yet worth repeating…Health standards should be written by medical and public health professionals, not those who make weapons for the military-industrial complex."[49]

Upon realizing that national standards are not prescribed by medical or healthcare professionals, but by scientists, engineers, and physicists who have ulterior motives which coincide with the industry, you are likely to agree with insider Dr. Robert Kane's assessment. In his book, *Cellular Telephone Russian Roulette*, Kane warns the public to be particularly wary of those who make the rules and decisions regarding safety in this country, because they are economically interested parties who are bias in their opinions and

---

[47] Petition for Inquiry of the EMR Network, Before the Federal Communications Commission, September 25, 2001, presented by attorney James R. Hobson, Miller & Van Eaton, P.L.L.C., Washington, D.C.

[48] Brown, Gary, *Wireless Devices, Standards, and Microwave Radiation in the Education Environment,* http://www.emfacts.com/wlans.html (October 2000).

[49] *Doesn't the FCC Standard Protect Us?,* http://www.goodhealthinfo.net/radiation/fcc_standard.htm (June 2007).

who are "acting in concert with your government." "Make no mistake, the success of the cellular telephone industry is significant revenue business for the government."

Therefore, instead of setting limits well below those which are known to cause multiple adverse health effects, the determination seems to be that the nation is willing to assume an "acceptable risk." The only problem with this assumption is that full disclosure of the risks assumed is not forthcoming.[50]

Cell Phone Regulation or Exemption?

If you still believe that somehow you are being protected from harmful cell phone radiation exposure, after reading this section you might believe otherwise.

Prior to 1993, there was no scientific evidence of thermal adverse health effects from radio waves below 40 W/kg, so it appeared that cell phones operating on less than 1 W/kg were no threat. Based on that premise alone, FDA scientists and government officials exempted cell phones from having to comply with the IEEE/ANSI safety exposure guidelines. Cell phones were also immune from having to meet any type of regulatory standard and were excused from all government mandated pre-market testing obligations.[51]

These decisions were wrongly substantiated, based exclusively on the thermal effects of radiation. The thermal effects, which result from the non-ionizing radiation of cell phones, were never even taken into account. As a result, the cell phone industry has been granted an undeserved and uncontrolled freedom that is just as economically satisfying for the industry as it is for standard setters and the government.

Dr. Quirino Balzano, a top Motorola scientist, confirms the exemption that the industry has been unjustifiably granted by saying: "With the current budget cut-backs, the agencies of the government will not have the time, the funds and the personnel to research the particular exposure conditions of the mobile communications transmitters. It is up to the industry to show reasonable evidence of adherence to safety standards and receive categorical exclusions."

---

[50] Robert Kane, *Cellular Telephone Russian Roulette* (New York, NY: Vantage Press, 2001), p. 116.

[51] George Carlo and Martin Schram, *Cell Phones: Invisible Hazards of the Wireless Age* (New York, NY: Carroll & Graf Publishers, 2001), p. 21.

Balzano further depicts the industry's primary concern with regard to complying with set safety standards: "Their proposition is that, since they don't quite understand the physics relating to electromagnetic fields to the near-zone of antennas, safety standards should not be enforced because it would be detrimental to the industry. Stricter safety guidelines will lead to increased legal problems."

To add to the perplexity, Dr. Kane quotes R. Cleveland, a FCC representative, as making the following startling confession during a private conversation: "The FCC doesn't want to regulate portable cellular telephones because it doesn't want to create a panic."[52]

It is not surprising that the exemption was fully agreed upon and accepted by the IEEE, the ANSI, and the FCC standard setting committees, as well as the cell phone industry. The decision to make cell phones exempt took place in much the same way as it did with the tobacco industry exemption. Tobacco products were successfully freed from having to comply with certain agricultural, environmental, and drug regulations which would have rendered them unsafe. As it was with the tobacco industry, lobbyists and cell phone industry representatives have triumphantly convinced the government to grant them unrealistic proposals of exemption, at the public's expense.

Kane makes two profound observations about this mind-boggling cell phone immunity. First, he claims that, "if it were not for the exemption that the industry promoted, the portables would be in violation of all accepted safety standards now in existence." And second, that, "if it were not for the categorical exclusion that exempted portable cellular telephones from any radiation exposure regulations, the devices would have been barred from the marketplace as unsafe for humans!"[53]

Apparently, the reason cell phones were exempt up to 1996 and safety standards concerning them were not being enforced is, as Balzano stated, because it would have been greatly detrimental to the industry. If cell phone power was reduced, they could be deemed useless and, if cell phones had to comply with what seem to be restrictive safety guidelines, the invitation for lawsuits would be extensive.

---

[52] Robert Kane, *Cellular Telephone Russian Roulette* (New York, NY: Vantage Press, 2001), pp. 122-123, 141.
[53] Ibid. pp. 10, 117-118, 195.

Therefore, rather than the government mandating safety and forcing the industry to take all necessary precautions to protect consumers, it granted the industry an exemption which allowed them to bypass all established safety measures. Outside of financial gain, it is difficult to understand why the needs of the wireless industry supersede those of the American people.

Specific Absorption Rate (SAR)

Today, there is one criterion that the industry is supposed to adhere to regarding cell phones; they are to limit cell phone exposure to specific absorption rate (SAR) parameters. SAR is a complex method of measurement used to determine radiation exposure and it represents the relative absorption of energy per second (watts), per unit of body mass (kilograms) at any given time. It is referred to as "watts per kilogram" and is written W/kg.[54] Two elements - frequency and power - are used to determine SAR. Varying frequency levels and power densities (energy + distance) result in different rates of absorption.

On the surface SAR measurements may seem practical and sound like valid preventative assurances, but these computations continue to be based on the assumption that all human tissue absorbs radiation at the same rate and that radiation is equally distributed. SAR averages radiation absorption taken from any one cubic gram of tissue, at any given time, rather than identifying organs such as the brain, which readily absorbs RF/MW radiation at a faster pace and is much more vulnerable to its intrusive energy.

Additionally, the SAR method of measurement is deceiving, because it can easily be manipulated to serve a given purpose. For example, averaging an SAR of 2 W/kg over 10 grams of tissue has an SAR of up to 6 W/kg when averaged over 1 gram of tissue. In other words, SAR can be significantly reduced by averaging absorption rates over a larger body mass. Due to this variance, it becomes readily apparent that cell phone users can be exposed to higher radiation levels than those allowed by SAR standards, without knowledge or consent.[55]

---

[54] Petition for Inquiry of the EMR Network, Before the Federal Communications Commission, September 25, 2001, presented by attorney James R. Hobson, Miller & Van Eaton, P.L.L.C., Washington, D.C.

[55] Melbourne, Alan, *Problems with the Rationale of the Draft Standard,* http://www.ssec.org.au/emraa/rf/may.htm (May 11, 2001).

Current IEEE/ANSI exposure guidelines for cell phones are set at an SAR of 1.6 W/kg. Some may assume that this level of exposure is extremely low and must offer some element of safety, but Dr. Henry Lai, one of the top biophysicist's in the field, disagrees. He, along with other researchers, have ascertained that biological consequences, such as cellular DNA damage, increased calcium efflux in cells, and decreased cell division, all transpire at exposure levels as low as 0.001 W/kg.[56] Although these small numbers may not seem like much, there is a huge difference between 1.6 W/kg and 0.001 W/kg. 1.6 W/kg is 1600 times greater than 0.001 W/kg.

The Environmental Protection Agency (EPA) also expressed concern, recognizing an SAR of 1.6 W/kg as being an unacceptable and unrealistic level of exposure to ensure safety. The agency reported, "The data currently available on the relationship of SAR to biological effects show evidence for biological affects at an SAR of about 1 W/kg." "In view of these laboratory studies, there is reason to believe that the findings of carcinogenicity in humans are biologically plausible."[57] Nevertheless, this is the safety guideline which has been adopted by the FCC.

Since the FCC lacks the necessary manpower and funding to ensure compliance, they fully rely on the self-regulated industry to conduct their own testing. To assess the reliability and adherence of cell phone manufacturers complying with prescribed SAR exposure limits, some phones were put to the test on ABC's 20/20 news program. Multiple testing methods were employed and the results were closely observed. It was discovered that several brands of cell phones exceeded the already detrimental national radiation exposure limit. [58]

If the RF/MW energy emitted from cell phones was evenly dispersed and absorbed throughout the entire body, SAR measurements might make more sense. If adverse non-thermal effects were taken into account, rather than ignored, SAR standards might be more satisfactory. If testing requirements were more

---

[56] Kasevich, Raymond S., *CS Medical Technologies LLC,* "Cell phones, Radar, and Health", http://www.spectrum.ieee.org/WEBONLY/resource/aug02/speak2.html (2006)

[57] Robert Kane, *Cellular Telephone Russian Roulette* (New York, NY: Vantage Press, 2001), p. 83.

[58] Begich, Nick and Roderick, James, *Earthpulse Press, Inc*., "Cell Phone Convenience or 21st Century Plague?,"
http://www.earthpulse.com/products/cellphoneplague.htm (July 2004).

stringent for manufacturers and an objective third-party was responsible for assuring compliance, the American people could have more confidence in these SAR exposure guidelines. And, most importantly, if standards that prevented any and all adverse health effects from occurring were accepted, the public could take comfort in being adequately protected. But the fact remains, SAR standards are clearly a deceptive way of falsely insuring safety.

CHAPTER 5

No Health Risks?

If cell phones pose no adverse health risks, then why have the FDA and the EPA made the following recommendations to consumers: limit cell phone use to emergency situations; reduce unnecessary calls; and use landline phones whenever possible?[59]

It's also peculiar that in October 2002, over one hundred German doctors signed a petition, stating that increased health problems resulting from cell phone use and chronic cell tower exposure were on the rise and being observed in numerous patients.[60] These medical professionals are not alone in their observations. Governments, organizations, scientists, researchers, and experts from around the world have also recognized a comparable impact and have expressed similar concern.

If you are a cell phone user who is unwilling to accept that any health risks, other then rare cases of brain cancer or brain tumors, have been linked to RF/MW radiation exposure, this chapter will give you much to consider. If nothing more, it should challenge you to contemplate whether cell phones are as safe as the industry has led you to believe.

---

[59] Robert Kane, *Cellular Telephone Russian Roulette* (New York, NY: Vantage Press, 2001), p. 229.

[60] The Freiburger Appeal. http://www.emrnetwork.org/news/IGUMED_english.pdf (October 2002).

Prescription Drugs

If there are no health risks tied to cell phone use and cell tower emissions, then why were U.S. pharmaceutical companies so eager to dump millions of dollars into the research and development of new drugs that would alleviate the exact symptoms that have been linked to RF/MW radiation exposure?

Personally, I don't believe in coincidences, especially in situations like these. Big businesses are shrewd and they usually only fork out hefty sums of money when they are all but guaranteed that their investment will produce an extremely lucrative return. Instead, I am led to presume that there was more than enough foreknowledge and scientific evidence for the pharmaceutical industry to invest in the upcoming needs of those who would suffer from RF/MW radiation exposure.

Studies focusing on this topic and revealing the body's undesirable response began decades prior to the emergence of cell phones. For example, in the early 1950s, the U.S. government was naive and reluctant to acknowledge that dangers existed from non-ionizing radiation exposure. To test their theory and to prove a point, in 1953 the Russians began irradiating the U.S. embassy in Moscow with low power microwaves, like those used to transmit cell phone signals. This invisible assault went on for close to 19 years, continuing long after the U.S. government was notified as to what was happening and who was responsible.

Yet, even after the discovery of the "Moscow signal" in 1962, the government allowed the experimental conduct to persist for another 10 years. The embassy staff was completely unaware that they were being involuntarily and chronically bombarded with RF/MW radiation. Instead of looking out for its employee's best interests, the U.S. government chose to use them as guinea pigs to test the relevance of the Russians' theory that non-ionizing microwaves were harmful to the human body. Furthermore, in order to properly examine and evaluate the situation, the CIA (Central Intelligence Agency) requested the assistance of an expert in the field to help decipher the ongoing data.

After close analysis of the information gathered from U.S. embassy staff, numerous symptoms were identified as being characteristic responses to this type of exposure. There was no question that a direct link existed between health complaints, measurable disorders, and the invisible, undetected RF/MW

exposure they were all irradiated with. The commonalties of headache, fatigue, anxiety, dizziness, insomnia, concentration difficulties, memory loss, depression and more, have since been confirmed time and time again in multiple research efforts. The consistent development of these seemingly unrelated exposure-induced ailments has led to a debilitating disease which has been appropriately labeled Microwave Sickness.[61]

Ironically, after learning that consumers were going to be faced with this chronic source of exposure, the pharmaceutical industry got busy developing and manufacturing drugs to help alleviate every symptom which corresponded to those of Microwave Sickness. Western doctors, who remain uninformed of this global syndrome, continue to advocate the various drugs emerging from the pharmaceutical industry. The majority are clueless as to the source of aggravation, treating each symptom as if it was unrelated to the others.

Again, it's hard to believe that the development of said drugs was purely coincidental; that the pharmaceutical industry was acting solely on hunches when they began creating drugs that miraculously addressed every single exposure-induced symptom. However, pharmaceutical companies weren't the only ones able to capitalize on a fore knowledge of the effects of non-ionizing microwave radiation. The medical industry also discovered how to utilize the same technology to their advantage.

Medical Use of Non-ionizing Microwave Radiation

If cell phone microwaves are not biologically reactive, then it's curious to understand why the medical community is rapidly incorporating the use of non-ionizing microwave radiation into numerous medical procedures. Such procedures include those which successfully heat and destroy deep bodily tissue, utilizing the same low power and frequencies as cell phones.

From as far back as 50 years, research findings have shown that electromagnetic waves induce effective and efficient deep tissue heating to the area in which its rays are directed.[62] To this day,

---

[61] Becker, Robert, O. and Selden, Gary, *The Body Electric* (New York, NY: William Morrow and Company, Inc., 1985), pp. 314-315.

[62] Schwan, H., P., and Piersol, G., M., "The Absorption of Electromagnetic Energy in Body Tissues," *International Review of Physical Medicine and Rehabilitation,* June 1955, pp. 424-448.

radiant therapy continues to successfully heal bone fractures and deep tissue wounds. Applications are also used in post surgical procedures to speed healing by reducing pain and swelling.

The low intensity EMFs (electromagnetic fields) that interact with the body so efficiently for medical purposes are at exposure levels well below current safety standards. This means that, while you are being told that no biological effects occur from the same type of exposure, there are medical applications being implemented that prove otherwise. The irony here is that the FDA approves of medically related radiation treatment devices, because it recognizes the body's positive response to them. Yet, when it comes to cell phone and cell tower exposure, it denies that the same category of low power signals has the potential to adversely interact with the human body.[63]

Even more unsettling, is the fact that medical professionals have determined that the 700-1000 MHz range of RF/MW radiation interacts most effectively with human tissue. Of this frequency range, it's believed that waves between 750-900 MHz are best suited for deep tissue penetration, cell destruction, as well as heating and radiation absorption without initiating pain. This same medically-preferred frequency range is also best for cell phone operation. Because of their distinctive properties, these frequencies are also the most dangerous frequencies known to man!

One such medical treatment that successfully implements this source of energy is diathermy. During this treatment non-ionizing radiation is used to heat tissue below the skin's surface, without the patient experiencing any pain or discomfort. Although diathermy treatments must heat tissue in order to be effective, it does not desire to cause damage. However, this is difficult to avoid. As with cell phone use, the rays used in diathermy treatments are delivered at 900 MHz in order to achieve deep tissue heating. Experiments with this treatment show that the characteristics of the two scenarios – diathermy and consumer cell phone use - are "so similar as to be indistinguishable."

Hyperthermia, another medical treatment, is a cancer radiation therapy technique used to destroy cancerous cells via deep tissue heating. Here in the U. S., it has been discovered that non-ionizing frequencies between 700-950 MHz can effortlessly attain this goal. Non-thermal microwave radiation targets cancerous cells,

---

[63] Sage, C., *The Bio Initiative Report,*
http://www.bioinitiative.org/report/docs/section_1.pdf (May 2008), p. 20

purposely intending to destroy them, but unfortunately what happens is that healthy cells are annihilated along with the cancerous ones. Since cells are in such close proximity, they can't be differentiated. This technique is very efficient and can be initiated without pain, burning sensations or discomfort.[64]

Similarly, in 2003, the U.K. government, along with the National Institute of Clinical Excellence (NICE), approved what has come to be referred to as "The 3-Minute Hysterectomy." This treatment is performed using a hand-held wand that removes the lining of the womb quickly and easily by emitting low-powered microwaves. The microwave emissions from the 'wand' heat and destroy uterine wall tissue without eliciting any pain, scarring or burning.[65]

These examples firmly reinforce just how inadequate and absurd U.S. safety standards are, by suggesting that without an internal rise in temperature no damage or adverse effects can occur.

Radiation procedures for multiple medical applications are being employed where the destruction of deep tissue is necessary to obtain the desired outcome. Realizing the powerful potential of microwaves, one has to wonder: If cell phones expose users to the same kind of non-ionizing frequencies of low power used in these medical procedures, how can holding a cell phone up to one's head *not* be harmful?

Military Use of Non-lethal Weapons

Last I knew, weapons were meant to inflict harm and to destroy an enemy. Although highly classified, the fact of the matter is that, for the past 40 years, electromagnetic, RF, and microwave technology at intensified levels, has been used to develop weapons that emit energy signals. These types of weapons are now being incorporated into the military armories of numerous countries around the world.[66] According to the former head of the Defense Intelligence Agency (DIA), Leonard Perroots, "the advent into the world's arsenals of directed energy weapons may be as revolutionary

---

[64] Robert Kane, *Cellular Telephone Russian Roulette* (New York, NY: Vantage Press, 2001), pp. 18-19, 22, 52, 202.

[65] "Energy Medicine/Positive Proof of MW-bio-effects", *Citizens' Initiative Omega,* October 7, 2003.

[66] Welsh, Cheryl, *Non-lethal Weapons, A Global Issue,* http://www.raven 1.net/welshnlw.htm (November 2001).

as was the introduction of the other great weapon developments of the 20th century - the machine-gun and the atomic bomb." U.S. experts say that the Soviet Union has the edge over the United States in developing what is known as "directed energy weapons" and "radiofrequency weapons."[67]

Radiofrequency electromagnetic weapons are considered non-lethal, because, even though their rays have the capacity to kill, they are not devised for that purpose. Instead, they are developed to inflict an unfamiliar form of torture and manipulation. This type of energy can easily disable computers, interfere with other wireless signals, and intervene with sensitive equipment, and in military combat this can be extremely advantageous.

However, pulses from these non-lethal weapons can do so much more. Signals can target the brain to interfere with normal, natural functioning and generate programmed responses. They can manipulate brain waves and cause subjects, both animal and human, to fall into a stupor, to experience flu-like symptoms, to become nauseated, to sleep or stay awake, and even to become confused and disorientated. Wave frequency can also match brain activity to control the victim's mind and manipulate the human psyche.

Like other weapons of warfare, these extremely powerful signals can be directed into groups. Whether the goal is to irradiate one person or many people, the waves invade without detection. There is never any evidence of an attack; there is no explosion or noise; and rarely is any pain or discomfort experienced. As it was with the irradiation of the U.S. Embassy in Moscow, anyone can be victimized by this silent antagonist and be completely unaware of the assault.

In combat these weapons are multi-functional. "The microwave bomb, which works by emitting a massive pulse of radio energy, would render humans unconscious by scrambling neural paths in the brain, but would not cause lasting injury."[68] The Vice President of the Russian Academy of Military Science, Vladimir Slipchenko, [stated that]: By directing energy emissions at a target it is possible to turn an enemy division into a herd of frightened

[67] Debusmann, Bernard, "Beam Weapons Predicted to Revolutionize War, Spur Arms Trade." Reuter *Library Report BC cycle.* Lexis-Nexis. March 28, 1990.
[68] Campbell, Christy, "Microwave Bomb That Does Not Kill", *Sunday Telegraph*, September 27, 1992, p. 6.

idiots.[69] Additionally, "[U.S. Air Force Major], Norman Routanen has proposed using very powerful microwave devices to confuse, disable, or even kill the enemy."[70]

RF energy also has a profound impact on breathing. Captain Paul Tyler, director of the U.S. Navy Electromagnetic Radiation Project from 1970-1977, stated: "It has been shown that normal breathing takes place at certain frequencies and amplitudes and not at others. Animals (like humans) forced to breathe at certain unnatural frequencies develop severe respiratory distress." Such difficulties can result in feelings of uneasiness and anxiety, which can lead to suffocation, even resulting in death.[71]

Mind Control

Mind control has also been researched by governments and has been going on since the 1940s. If you've ever had occasion to watch someone be hypnotized, you were likely made aware of how the power of suggestion can be used to render an immediate, delayed, or word-provoked action. The use of RF energy aimed into a person's brain can trigger the same types of responses. Emotions, behaviors, and actions can all be roused without the subject's conscious awareness of what is taking place or why. Also, amnesia-like symptoms can be projected, to inhibit the recall of information, events or situations. Some people willingly seek to be hypnotized to revert to past memories, to quit smoking, or to lose weight, but there are others who are involuntarily and unknowingly being exposed to this same type of mind control.

Dr. William Van Bise, a radio engineer who investigated the 1970s Russian Woodpecker radio signal that was broadcast throughout the U.S., said that the easiest way to disrupt the mental process would be with microwaves. Pulsed microwaves, like those in digital phones, have been successfully used for mind control; they work like subliminal messaging. Inaudible messages can be transferred through microwaves into the subconscious mind, effectively bypassing the conscious, to conveniently change thoughts

---

[69] Pillsbury, Michael, Senate Intelligence Committee. *Federal News Service.* Lexis-Nexis, September 18, 1997.

[70] Miller, Marc S., "Ambiguous War the United States and Low-Intensity Conflict", *MIT Alumni Association Technology Review,* August 1987, Vol. 90 p. 60.

[71] "Have the Radiofrequency Weapons Been Put to Use Yet?," http://www.wealth4freedom.com/truth/12/mindcontrol.htm (November 2002).

and behavior. Signals from outside radiation sources, using electromagnetic technology, can imitate the mind's electrical pulses. Persons under attack are completely unaware that their thoughts, responses, and actions are being influenced by someone other than themselves.[72]

In 1963, Dr. George Estabrooks, the man who initially proposed the use of hypnosis in military warfare, admitted to doing extensive work for the CIA, the FBI, and military intelligence. He referred to his occupation as "child's play," because he was able to successfully create an effective spy, a dedicated assassin, and even change the personalities of unsuspecting subjects. During the same year President Kennedy was shot, Estabrooks suggested that Lee Harvey Oswald and Jack Ruby "could have very well been performing through hypnosis."[73]

Between 1953-1972, when the Russians were irradiating the U.S. embassy in Moscow with non-ionizing microwaves, some curious happenings transpired. For instance, during a Senate hearing on MKULTRA (the CIA's Program of Research into Behavioral Modification) in September 1977, Dr. Gottlieb, director of experiments, warned congress that the Russians had been actively pursuing the use of intelligence weapons against the U.S. Government. Even more curious is that, while traveling to Russia in 1972, President Nixon's staff reported his behavior as being 'inappropriate' at times, recalling instances when he would cry without provocation.[74]

The 1967 mood altering and mind control experiments at Montauk Point, a U.S. Air Force base in New York's Long Island, offer another case in point. It was discovered that, by changing the frequency and pulse duration of the Sage radar, transmission of electromagnetic waves uniformly changed the personality and mood of everyone exposed.

The experiment began on a small scale, yet within a very short period of time military technicians expanded the radar's signal to reach upstate New York, New Jersey, and Connecticut. Using special technology, technicians were able to assemble each irradiated

---

[72] "David Brinkley News Program," #47592, aired July 16, 1981.
[73] Anonymous, *Mind Control and The Intelligence Services*, http://www.wakeupmag.co.uk/articles/mind.htm
[74] Welsh, Cheryl, *U.S. Human Rights Abuse Report: A Factual Report in Support of the need for International Investigation,* http://www.dcn.davis.ca.us/~welsh/7.htm (January 1998).

person's thoughts, and have their computers translate the data and display the results on their screens.[75]

Even now, U.S. Defense has an active project in Alaska, known as H.A.A.R.P. (High-frequency Active Auroral Research Project), which has similar capabilities of administering this type of mind control. An expert reveals that, "HAARP is a secret undertaking that is not unlike the Manhattan Project, which gave us the atomic bomb."[76]

The idea of being able to project one's thoughts into someone else's mind is extremely bizarre, yet it is no longer science fiction.

The purpose for sharing this information with you regarding the use of microwaves as non-lethal weapons is not to insinuate that this type of manipulation and mind control is taking place through the waves being emitted from your cell phone or from cell towers. It is simply to acquaint you with the incredible power and magnificent impact these invisible and undetectable microwave signals have.

Radiation Shielding Patents

If cell phones aren't dangerous, then it's difficult to understand why the leading cell phone manufacturers have spent thousands of dollars over the past 15 years quietly acquiring various radiation shielding patents to protect consumers from their phone's emissions. In the mid-to-late 1990s, Nokia, the number one cell phone supplier, obtained multiple patents to reduce electromagnetic (RF/MW) radiation exposure to cell phone users' heads. Motorola and Ericsson have also received various radiation-reducing patents for their phones. Other radiation-reducing patents have been secured by Hitachi, Mitsubishi, and Alcatel N. V.

"The patents speak for themselves. Here these folks have the ability to protect consumers from being radiated and they're unwilling to spend a couple bucks to do so. It's outrageous," declares attorney Carl Hilliard, wireless safety advocate.[77]

---

[75] Anonymous, *Mind Control and The Intelligence Services*, http://www.wakeupmag.co.uk/articles/mind.htm

[76] Welsh, Cheryl, *U.S. Human Rights Abuse Report: A Factual Report in Support of the need for International Investigation,* http://www.dcn.davis.ca.us/~welsh/7.htm (January 1998).

[77] Silva, Jeffery, "Manufacturers (Nokia's) Own Patents to Cut Radiation", *RCR Wireless News,* June 4, 2001.

Dr. Kane discloses what he learned as an industry insider, "Even while the numerous reports of high energy absorptions continue, manufacturers claim there is no possibility of harm as a result of operating their portable phones. However, it is known that they engaged in research to shield the heads and brains of users from the penetrating radiation – but only after the hazard issue became public."[78]

Long Term Studies Proving Safety

If cell phones aren't dangerous, then why has the industry refused to fund any long term studies to prove safety? In an effort to have them do just that, Dr. Elizabeth Jacobson, the FDA's Director of Science, recommended that the CTIA incorporate critical post-market surveillance studies as "an ongoing cost of doing business". But the recommendation was never taken seriously.

According to Dr. Carlo, in a 1997 meeting with three top Motorola executives, the importance of a post-market plan was brought up, only to be quickly shot down. Another attempt was made to convince those at the CTIA of the necessity of this vital on-going research, but vice president Jo-Anne Basile made it clear that the CTIA would not fund any post-market surveillance because cell phones were not pharmaceutical drugs.

In 2000, the industry was given another opportunity to prove safety when the FDA and the CTIA signed the Cooperative Research and Development Agreement (CRADA). Carlo outlines the inexplicable contract, "Under the government-industry research agreement there would be no new animal studies and none of the human studies that the government itself had once considered vital. And there would be no tracking and monitoring of the long-term health of people who use mobile phones." Under the provisions of CRADA, "the government agreed that the cell phone industry would pay for all the research studies - and what the industry would get for its money was the right to make all final decisions about which studies would be done and which scientists would do them. The industry and its designated scientists would also have the final say on whether and when the findings would be published." Carlo adds that, "In the executive branch and in congress, the watchdogs that

[78] Robert Kane, *Cellular Telephone Russian Roulette* (New York, NY: Vantage Press, 2001), p. 212.

were supposed to protect the public interest…never barked. They have failed to warn the people they are paid to serve."[79]

Lloyd's of London Rejects Industry

Did you know that Lloyd's of London, the world's largest risk takers, have declined to insure the cell phone industry against users' potential health claims? Due to a genuine concern of cell phone safety and the copious and serious health risks linked to cell phone use, John Fenn, a Lloyd's of London representative from the Stirling underwriting group, has refused to insure cell phone manufacturers against health-related claims. Numerous studies indicating a strong correlation between cell phone use and the development of tumors, cancer, brain damage, and Alzheimer's, are apparently too perilous for the company to accept. Lloyd's of London insured the tobacco industry and it seems they are unwilling to make the same mistake twice.[80]

Furthermore, even as the industry continues to convince you of cell phone safety, manufacturers are simultaneously and secretly administering a strategy that entirely contradicts it. In the early months of 2007, during a conference call with Dr. Carlo, it was disclosed that the cellular industry has set up a $6 billion dollar insurance fund of its own to pay for health related law suits, which are likely to arise in the future.[81]

That's odd. Why would a multi-billion dollar insurance account need to be established for something that, by all accounts, shouldn't be an issue?

---

[79] George Carlo and Martin Schram, *Cell Phones: Invisible Hazards of the Wireless Age* (New York, NY: Carroll & Graf Publishers, 2001), pp. XIII, 139-141.

[80] Ryle, Sarah, "UK Insurers Balk at Risks of Phones", *The Observer,* http://www.goaegis.com/articles/observer_041199.html

[81] Carlo, George, conference call via BIOPRO International, Inc. (January 2007).

CHAPTER 6

Hidden Health Hazards

What Americans are not being told, is that 3 out of 4 independent, scientific global research studies show adverse biological effects resulting from low-level, non-ionizing microwave radiation, like that which emanates from cell phones. Even conservative researchers believe that such effects are "probable", much more likely to occur than by mere possibility or random chance.[82]

Also hidden from consumers is the fact that for three decades between 1960 and 1990, over 40 studies confirmed and clearly demonstrated that RF/MW radiation does have an adverse biological health effect on human beings.[83]

Regardless of what you currently choose to believe or not believe, one thing is certain. Until objective investigative studies proving safety are conducted and confirmed, cell phone users are involuntarily participating as test subjects for what could be one of the world's largest research efforts of our time.[84]

---

[82] Glaser, Margaret Meade, "What Americans Need to Know about Radiation (or EMR) from Wireless Communications," *The EMR Network,* http://www.emrnetwork.org

[83] Cherry, Neil, *Neurological Effects of Radiofrequency Electromagnetic Radiation,* "Health Effects Associated with Mobile Base Stations in Communities: the Need for Health Studies," http://www.mapcruzin.com/news/cell062501d.htm (June 8, 2000).

[84] Philips, Alasdair, "Adverse Health Concerns of Mobile Phones", *Australia's Powerwatch Network*, http://frontpage.simnet.is/vgv/alist.htm

The Human Body

Over the past 60 years the world, which began with a natural static field of background radiation, has evolved into an oscillating field of electromagnetic radiation (EMR). The EMR and the wireless RF/MW radiation that the human body is now being exposed to originated when information was converted into waves being transmitted to and from close range antennas, or, in layman's terms, with the development of radio and television. Since then, the human body has been increasingly barraged with RF signals and microwaves from countless other sources.

Wireless technologies used to transmit and receive signals from cell phones, cell towers, Internet connections like Wi-Fi, satellite, radar, and other similar apparatuses, all significantly impact the environment, the body, and its state of well-being. The rapid advancement in the number of these manmade devices, accompanied by their radiating signals, has increased your exposure to 10,000 times more than that of your ancestors.

According to Dr. Neil Cherry, a leading New Zealand physicist in this particular area, oscillating fields emitted from wireless technologies are unnatural and unlike the normal static fields which are naturally present. While the human body is able to accommodate natural fields, oscillating fields interfere with the body's normal functioning and change cell behavior. Cherry explains how such abnormalities occur: "Biology reveals that brains, hearts and cells use electromagnetic signals, charged ions, voltage-gated ion channels, ion regulated gap junctions, all of which can be interfered with by external electromagnetic fields in subtle but vital ways in relation to health." [85]

Lest there be any unnecessary confusion, the EMR spectrum *includes* RF/MW radiation. Multiple studies have shown that cell phone radiation "mimics" EMR, both biologically and physiologically. Therefore, the previous statement could plausibly infer that external radiation fields, including those from cell phones,

---

[85] Cherry, Neil *"Evidence that Electromagnetic Radiation is Genotoxic: The Implications for the Epidemiology of Cancer and Cardiac, Neurological and Reproductive Effects,"* Extended from a paper presented to the conference on Possible Health Effects on Health of Radiofrequency Electromagnetic Fields, 29th June 2000, European Parliament, Brussels. *Cherry Environmental Health Consulting,* http://www.neilcherry.com

cell towers, and other external RF/MW radiation fields, interfere with critically necessary signaling channels in the human body.

This same electromagnetic interference is what causes the disruption or encumbrance of computers and other electronic equipment, in various situations. It is precisely why cell phone use is prohibited in hospitals and during aircraft take-off and landing. Cell phone communication signals can adversely affect the performance of electrically sensitive medical equipment, as well as cause static interference, disturb, or obstruct wireless communication signals to and from the air traffic control tower.

Compare these external examples of interference with the various ways the electronically sensitive human body can be internally affected by wireless signal exposure.

Identifying Problems

The biological effects experienced from RF/MW radiation exposure are dependent on a variety of factors. Frequency, duration, intensity, waveform, and power all play a key role in determining the effect that obtrusive exposure will have on various parts of the human body. It's quite possible that small amounts of this type of energy can have the same impact as massive doses, when delivered in the appropriate manner.[86] And contrary to the widely held assumption that older analog signals are more dangerous than newer digital signals, digital GSM phones emit pulsed microwaves which are biologically more interactive than the continuous wave of analog phones at the same frequency and power level. Digital phone pulses attack the user's brain cells at a rate of 217 times per second, and these pulses aren't exclusive to users. They also interfere with all who are in close proximity.[87]

Microwave radiation emissions have been found to promote stress, cause damage, and induce disease, as well as dysfunction. During the first 60-90 seconds of cell phone exposure three detrimental effects transpire. First, tissue and cell damage occurs, causing destruction and death of cells. Second, there is a repression of normal cell growth, and, third, an increase in membrane

---

[86] Begich, Nick and Roderick, James, *Earthpulse Press, Inc*., "Cell Phone Convenience or 21st Century Plague?," http://www.earthpulse.com/products/cellphoneplague.htm (July 2004).

[87] Philips, Alasdair, "Adverse Health Concerns of Mobile Phones", *Australia's Powerwatch Network,* http://frontpage.simnet.is/vgv/alist.htm

penetration takes place. There is also evidence that the enzymes and proteins necessary for repairing damaged and abnormal cells, along with DNA strand breaks, become depressed and inoperable.[88]

In April 2001 the ECOLOG Institute in Hanover, Germany reported their findings on a study carried out by the German cell phone service provider T-Mobil. Physicists, medical scientists and biologists were enlisted to participate in the comprehensive study where numerous observations were made regarding the impact of cell phone RF/MW radiation on the human body. Their conclusions resembled those of other well respected researchers. "Experiments on cell cultures yielded clear evidence for genotoxic effects…like DNA breaks and damage to chromosomes, so that even a cancer-initiating effect cannot be excluded any longer." Cell transformation, cell promotion, and cell communication, as well as "disturbances of other cell processes, like the synthesis of proteins and the control of cell functions by enzymes, have been demonstrated."

The T-Mobil study also discovered recognizable "…modifications of the brain potentials and impairments of certain brain functions", which included blood brain barrier permeability along with an obvious deficit in learning capabilities and other cognitive operations. "Evidence for disturbances of the hormone and the immune system(s)" were detected as well. Cell phone radiation exposure was also shown to increase the production of stress hormones and cause stress reactions. A reduction of the hormone melatonin, the body's most powerful antioxidant which regulates the wake/sleep cycle, was similarly observed. [89]

Another European study examined 70,000 cell phone users and found that 20% associated their recurring headaches and fatigue to exposure. The data also revealed that 47% who were on their phone for an hour or more a day experienced at least one of the following symptoms: dizziness, concentration difficulties, memory loss, or a burning sensation near the ear where their phone was held.[90] Other similar research projects have reported that 70% of cell phone users experience one or more of the following common abnormalities while on their phone: warmth around the ear, facial

---

[88] Robert Kane, *Cellular Telephone Russian Roulette* (New York, NY: Vantage Press, 2001), pp. 12, 20.

[89] Health Effects of Microwave Radiation (Western View), *http://www.Goodhealthinfo.net/radiation/health_efx_western.htm*

[90] Raloff, J., "Researchers Probe Cell Phone Effects," *Science News*, February 12, 2000.

burning or tingling, fatigue, headache, dizziness, discomfort, concentration difficulties, and memory loss. These symptoms have all been identified as early warning signs of what could result in permanent, irreversible neurological damage.[91, 92]

Dr. Kejell Hansson Mild of the Swedish National Institute for Working Life, along with an international advisory group, discovered that the symptoms of headaches, dizziness, feelings of discomfort (pain, anxiety, irritability, or moodiness), and difficulties with concentration were experienced in direct correlation with cell phone use. In other words, symptoms elevated in occurrence as the number of calls escalated and as time on the phone increased. From over 15,000 randomly selected cell phone users, the prevalence of symptoms was significantly raised by as much as six times.[93]

These types of problems are being reported all over the world by casual cell phone users. Complaints to the Powerwatch Network of Australia revealed that headaches are usually first to develop. Headaches are often followed by concentration difficulties and short term memory loss, both of which have subtle beginnings that increase with exposure. Then fatigue or excessive tiredness transpire and are likely to be accompanied by a tingling sensation or heating of the skin, eye spasms or buzzing in the head.[94] Symptoms that begin as neurological can advance to promote autonomic vascular changes, which can affect blood pressure, induce sweating, or result in skin rashes. Cardiac symptoms, such as heart pains or ECG alterations, can also develop.[95]

Other documented non-thermal biological effects, resulting from external exposure to electromagnetic fields, include: cell membrane permeability; alterations of the signal transduction processes, resulting in abnormal cell behavior; changes in calcium ions; ornithine decarboxylase, protein kinase C and cAMP activities;

---

[91] Salford, Lief, G. et al. "Nerve Cell Damage in Mammalian Brain after Exposure to Microwaves from GSM Mobile Phones," *Environmental Health Perspectives*, Vol. 111: pp. 881-883, 2003.

[92] Sandstrom, Monica, et al., "Mobile Phone Use and Subjective Symptoms: Comparison of Symptoms Experienced by Users of Analogue and Digital Mobile Phones," *Occupational Medicine* Vol. 51, 2001, pp. 25-35.

[93] George Carlo and Martin Schram, *Cell Phones: Invisible Hazards of the Wireless Age* (New York, NY: Carroll & Graf Publishers, 2001), pp. 118-119.

[94] Philips, Alasdair, "Adverse Health Concerns of Mobile Phones", *Australia's Powerwatch Network,* http://frontpage.simnet.is/vgv/alist.htm

[95] Sadcikova, M., "Biologic Effects & Health Hazards of Microwave Radiation", international symposium sponsored by WHO (World Health Organization), Warsaw, 1973. Warsaw: *Polish Medical Publishers*, pp. 261-267, 1974.

alterations in DNA synthesis; enzyme activity; ion transport; cell proliferation; and transformations in the entire cell cycle.[96] Additionally, numerous studies support a very significant increase in a wide variety of cancers and tumors, DNA damage, chromosome abnormalities, as well as frightening consequences to the neurological, cardiovascular, reproductive, respiratory, digestive, hormonal, and immune systems.

It is important to recognize that a number of the above mentioned effects have been found to occur at levels far below those that are considered safe by the U.S. government. That is to say, that many of these detrimental consequences transpire at exposure levels 100 to 1000 times below FCC safety standards.[97]

Are You Sick?

Do you suffer from headaches? Migraines? Fatigue? Depression? Anxiety? Irritability? Dizziness? Nausea? Blood pressure alterations? Tinnitus? Impotence? Infertility? Insomnia? Concentration problems? Learning difficulties? Forgetfulness? Memory loss? or Confusion?

You are not alone. Globally, millions of people suffer and take medication for one or more of these identical symptoms. Although there are multiple sources which can elicit these types of bodily reactions, each and every one of these seemingly unrelated ailments has been shown to be a direct consequence of RF/MW radiation exposure. When you are sick, you go through a process of elimination to identify the root cause or irritant of your dilemma; what you discover and the decisions you make regarding that discovery can often put you on the road to recovery. Consider taking a closer look into this, because you may have a medical condition known as Microwave Sickness, which was introduced in the previous chapter.

The most common symptoms of Microwave Sickness are: chronic excitation of the sympathetic nervous system or stress

---

[96] Philips, Alasdair, "Adverse Health Concerns of Mobile Phones", *Australia's Powerwatch Network,* http://frontpage.simnet.is/vgv/alist.htm

[97] Cherry, Neil *"Evidence that Electromagnetic Radiation is Genotoxic: The Implications for the Epidemiology of Cancer and Cardiac, Neurological and Reproductive Effects,"* Extended from a paper presented to the conference on Possible Health Effects on Health of Radiofrequency Electromagnetic Fields, 29th June 2000, European Parliament, Brussels. p. 34. *Cherry Environmental Health Consulting,* http://www.neilcherry.com

syndrome; high blood pressure; headaches; dizziness; eye pain; sleeplessness; irritability; anxiety; stomach pain; nervous tension; concentration difficulties; hair loss; increased risk of cataracts; appendicitis; reproductive problems; extreme exhaustion; heart disease; heart attack; and cancer.[98]

Although the name and existence of this disease may be unfamiliar to you and your doctor, it's very likely that you or someone you know is struggling with any one or more of these symptoms as a result of RF/MW exposure. The development of Microwave Sickness is characterized by changes in brain activity and EEG patterns. These are typically followed by an attack on the central nervous system.[99]

Despite the fact that the vast majority of western physicians remain unaware of the existence of Microwave Sickness, medical experts in many other parts of the world are recognizing, diagnosing, and treating this monumental epidemic. However, if you question the validity of the illness, allow me to share a personal experience with you.

While Steve and I were searching for answers, his primary care physician sold his practice. You can't imagine how excited I was to learn that the doctor who bought the practice had studied in Russia. I was sure that he was the answer to our prayers after I called his office and learned that he was very familiar with Microwave Sickness. An appointment could not be scheduled soon enough.

When we were finally able to meet with the young professional, I asked him to educate us on all he knew about the disease. He gave us an ear full over the next 15 minutes, mainly because I asked question after question. He was happy and willing to discuss his expertise in this area and I thought: "Finally, we have a doctor who understands Steve's problem and will find us the help we need."

As soon as he finished talking, I dropped the bomb. "We need your help," I confessed.

The smile on his face and the enthusiasm with which he had shared his knowledge instantly faded. He looked at both Steve and me sternly. Then, as if to defend himself he put both of his hands up

---

[98] Hocking, B., "Microwave Sickness: A Reappraisal," *Occupational Medicine* Vol. 51: pp. 66-69, 2001.

[99] Cherry, Neil, *"Cell Phone Radiation Poses a Serious Biological and Health Risk,"* http://www.buergerwelle.de/pdf/cell_phone_radiation_poses_a_serious_biological_and_health_risk.pdf (May 7, 2001).

in front of his chest as to push away the idea and a frightened look made its way to his face as he headed toward the door. He spoke firmly and very adamantly. “No, no. I can not help you. No, not here in the United States. No, no.” We were dumbfounded as he quickly exited the room.

Needless to say, both of us we were extremely taken back, confused, and discouraged. I was appalled that, as a medical professional, he was not only familiar with the disease, but he had the answers we’d been searching for. Yet because of his geographic location, he was opposed to providing us with any assistance. For me, his unusual and seemingly fearful response clearly demonstrated how strongly RF/MW exposure and the known adverse health effects were connected, and how fiercely the information was being concealed from the American people.

As represented in the previous section, studies continue to validate the existence of the illness known as Microwave Sickness. Updated research offers a collective list of most all of the hidden health hazards which are known to result from RF/MW radiation exposure. They include, but are not limited to:

- Brain Activity Alterations
- Slowing of Reaction Time
- Memory Loss
- Anxiety
- Depression
- Irritability
- Hearing Abnormalities
- Vision Problems
- Motor Skill Loss
- Concentration and Learning Difficulties
- Nausea
- Sleep Disturbances
- Passivity
- Blood Pressure Alterations
- Behavioral Changes
- Convulsions

Presently, it is estimated that over 3% of Sweden's population, more than 285,000 people, have been diagnosed as electro sensitive, because of increased amounts of EMF (electromagnetic fields) in their environment. RF/MW radiation falls into the same electromagnetic category as EMF and EMR, it thereby duplicates its adverse biological effects so much so that Swedish victims experience symptoms identical to those of Microwave Sickness sufferers.

The Swedish Government has even gone so far as to recognize the illness as such a debilitating condition that those affected are entitled to compensation under a plan similar to that of the U.S. Social Security/Disability Program.

Similarly, over 2 million people in Britain suffer from these same symptoms and have been identified as being electro sensitive.[100]

Unfortunately, Americans who are electro sensitive or who have developed Microwave Sickness are destined to suffer alone in their misery. From a personal standpoint, I know just how devastating this can be for a person. It is unbelievably frustrating not only to function under such conditions, but to try and get others to understand your circumstances, so that proper care can be obtained. Both of these diseases are seriously debilitating, robbing people of the dignity and the quality of life they once treasured.

Damaging Effects are Rarely Immediate

The fact that RF/MW radiation is non-thermal and doesn't always generate initial adverse reactions, presents another form of deception, one that is self-imposed. Operators assume that if they don't suffer from any immediate symptoms, they're probably not being affected. However, the preliminary development of long-term damaging effects is often unnoticeable, because they seldom occur instantaneously. As with the development of any adverse health condition, individual results vary in terms of time, degree of exposure, and intensity.

Whether or not your body has an instantaneous reaction to your phone's emissions, Dr. Kane and other experts know that there is one thing you can be sure of. "If a cellular telephone operator picks up a portable and makes a call it should be with the knowledge

[100] Raising awareness of the harmful effects of cell phone masts: http:// www.Mast-Victims.org (2006).

that he will also be modifying the functioning of his brain for about the next week. Every action that occurs in that individual's life during that next week will be affected by the EEG modifications resulting from the portable cellular telephone call." EEG alterations in the brain are experienced as memory loss, mood swings, and a decrease in motor skill ability.[101]

It is critical to understand that, even though you may not experience any blatant exposure-related effects immediately, irreversible damage can begin to establish itself without your knowledge or awareness. Effects often start so subtly that once the problem is finally identified; there is little that can be done to correct it.

According to a 36 year compilation of Russian scientific studies (1960-1996) known as the Russian Medical Literature, it was discovered that both objective and subjective exposure symptoms are cumulative in nature. The data extracted from this thorough investigative anthology indicated that subjects experienced little to no effect within the first three years of exposure. However, the severity and frequency of symptoms increased with exposure; between the third and fifth year symptoms emerged and gradually increased. Following the fifth year of exposure ailments became more intense and continued to persist.

It was also reported that early exposure symptoms, those which occurred within the first five years, were reversible and could even be eliminated if exposure was reduced or avoided. Conversely, after five years of exposure, symptoms remained, increased in intensity, and became permanent. At this time, it was found that neither an exposure reduction nor complete avoidance could revert the victim to a previous state of well being.

Contrary to what the industry wants you to believe, scientists and researchers began studying the effects of non-ionizing radiation long before cell phones came into existence. As early as the late 1960s, numerous studies repeatedly revealed that even small doses of low level, cell phone type RF/MW radiation could cause adverse health effects.

---

[101] Robert Kane, *Cellular Telephone Russian Roulette* (New York, NY: Vantage Press, 2001), p. 100.

Substantiated evidence of the following consequences is undeniable. Cell phone RF/MW radiation exposure is known to:

- Heat the Head
- Penetrate the Blood-Brain Barrier
- Damage Brain Tissue
- Disrupt Brain Activity
- Alter Brain Waves
- Distort Brain Chemistry
- Damage DNA
- Reverse Cell Membrane Polarity

For the remainder of this chapter, along with the next three, the focus will be to identify the adverse health effects which have been shown to elicit a recognizable, significant, or dose-response impact on the human body as a result of EMF and RF/MW radiation exposure. According to over 1500 studies, which make up the Russian Medical Literature, the abnormalities which are likely to develop within the first 3-5 years are identified by an asterisk *. Those which are unmarked take longer to evolve.[102]

Physical Concerns:

Deterioration of Physical Capabilities*

The deterioration of physical capabilities can easily be attributed to neurological impairments, which are known to occur as a result of low intensity RF/MW radiation exposure. A decrease in motor skill ability, a slowing of reaction times, significant behavioral changes, and memory loss are some of the first physical signs to develop from exposure.

Hair Loss

Hair loss is a common response to cancer radiation treatments. It has also been shown to transpire as a result of RF/MW

[102] Maisch, Don, *"Biological Effects of Electromagnetic Fields on Humans in the Frequency Range 0 to 3 GHz: Summary and Results of a Study of Russian Medical Literature from 1960-1996,"* presented to the 10th International Montreux Congress on Stress, Montreux, Switzerland, Feb. 28-March 5, 1999. *Citizens' Initiative Omega*, www.grn.es/electropolucio/omega138.htm

radiation exposure. Although according to research, this consequence usually takes over five years to manifest.

Premature Aging

Some scientists believe that constant cell phone use causes premature aging. Dr. David Pomerai, head of the research team at Nottingham University's School of Biological Sciences, states that: "Low level radiation from the phone 'heats up' body cells, damages skin, and makes the user look lined and haggard." He goes on to say that: "Heavy mobile phone users are just like heavy smokers, who constantly inhale cell-damaging toxins without allowing the body time to repair the harm."[103]

Dr. Leif Salford, neurosurgeon at Lund University in Sweden, along with biophysicist, Dr. Bertil Persson and Dr. Neil Cherry all acknowledge that low doses of microwave radiation from GSM (digital) phones and other sources contribute to premature aging.[104] Evidence of increased cell death and cell damage, along with the reduction of melatonin which increases free radicals, both resulting from RF/MW radiation exposure, accelerates the aging process which promotes premature aging.[105, 106]

Thyroid Hyperfunction*

Thyroid Hyperfunction, also known as Hyperthyroidism, results from the overproduction of thyroid hormones. Thyroid hormones influence the body's metabolic processes. This abnormality can initiate a variety of disorders, including the development of Grave's disease, toxic adenomas, sub acute thyroiditis, pituitary gland malfunction, and cancerous growths in the thyroid gland.

---

[103] "Using a Cell Phone Makes You Age Faster," *Daily Mail*, October 18, 1999. http://www.earthpulse.com/src/subcategory.asp?catid=4&subcatid=3

[104] "Swedes Find GSM Radiation Causes Nerve Damage at Very Low Doses," *Microwave News*, Vol. 23, No. 1, January/February 2003.

[105] Cherry, Neil *"Evidence that Electromagnetic Radiation is Genotoxic: The Implications for the Epidemiology of Cancer and Cardiac, Neurological and Reproductive Effects,"* Extended from a paper presented to the conference on Possible Health Effects on Health of Radiofrequency Electromagnetic Fields, 29th June 2000, European Parliament, Brussels. p. 14. Cherry Environmental Health Consulting, http://www.neilcherry.com

[106] Reiter, R.J., et al., "Melatonin in the Context of the Free Radical Theory of Aging," Ann. *N.Y. Academy of Science,* Vol. 786: pp. 362-378, 1996.

Burning Sensations

Non-thermal radiation doesn't usually produce a detectible heating effect. However, multiple studies have revealed and confirmed that cell phone users experience feelings of warmth, discomfort, pain, tingling, and burning on the face or near the ear where the phone is held. Manufacturers and service providers want you to believe that heating must take place before any damage can occur, but research indicates otherwise. Evidence supports findings that damage can develop within the first 60-90 seconds of cell phone exposure. Once heat, pain or dull, achy sensations are experienced, deep tissue damage has already been imposed.[107]

Rashes

Rashes from exposure can emerge anywhere on the body. My late husband, Steve, had a large rash on his back and a smaller one on his forehead. They were always visible, but when he was in close proximity of a cell tower being exposed to its powerful waves, his rashes would almost instantaneously turn bright red. Away from the irritant, the color would eventually revert back to its previous state; the rashes never disappeared.

Optical Concerns:

Eye Damage / Visual Disturbances

As you have learned, eyes are extremely sensitive to microwaves and readily absorb their energy. Studies have shown that low power, pulsed RF/MW radiation at levels considered safe, damage the cells covering and protecting the eyes.[108] Blurred vision has been identified as a result of exposure, especially continual exposure.[109]

---

[107] Robert Kane, *Cellular Telephone Russian Roulette* (New York, NY: Vantage Press, 2001), pp. 22, 24-26, 52.

[108] Kues, H. A., Monahan, J. C., D'Anna, S. A., McLeod, D. S., Lutty, G. A. and Koslov, S., "Increased Sensitivity of the Non-Human Primate Eye to Microwave Radiation Following Ophthalmic Drug Pretreatment," *Bioelectromagnetics* Vol. 13: pp. 379-393, 1992.

[109] Barbaro, V., Bartolini, P., Donato, A., Millitello, C., Altamura, G., Ammirati, F. and Santini, M., "Do European GSM Mobile Cellular Phones Pose a Potential Risk to Pacemaker Patients?," *Pacing Clin. Electrophysiology,* Vol. 18: pp. 1218-1224, 1995.

Cataracts

Cataracts, or the induction of lens opacities, have been found to develop as a result of acute, high levels of RF exposure.[110] In 1959, Milton Zaret, a New York ophthalmologist, conducted a study for the Air Force to determine if there was a connection between radar exposure and eye problems experienced by military personnel. At first, there was no correlation between the two, but later it became apparent that the microwaves had deeply penetrated the eye tissue. Cataracts had developed behind the posterior capsule lens. Other research has concurred Zaret's findings. Airline pilots, air traffic controllers, and others who are heavily exposed are also at risk of developing this atypical eye condition.[111]

As a side note to optical concerns, it has been reported that cell phone users who wear metal-framed eyeglasses significantly increase their eye exposure, absorbing up to 60% more radiation than those who wear plastic frames or contact lenses. [112]

Auditory Concerns:

Hearing Disturbances & Tinnitus

Tinnitus, a hearing disturbance recognized as ringing in the ears, is a known occurrence that results from RF/MW radiation exposure. It has long been recognized beyond a reasonable doubt and seems to be widely accepted, since it is without much controversy.[113]

Dr. Allen Frey, a foremost authority in this area, was the first to discover and term the phrase "microwave hearing effect" in the 1960s. The microwave hearing effect produces both audible and inaudible noises that have been identified in a variety of ways - sounds ranging from ringing, to screeching, to buzzing, to hissing, to humming, clicking, or chirping.

---

[110] *ACN Online*, "Electrical Sensitivity: A Global Growing Concern. How Wireless Technology May Impact Child Development and Central Nervous System Functioning," Association for Comprehensive Neurotherapy.

[111] Becker, Robert, O., and Selden, Gary, O., *The Body Electric* (New York, NY: William Morrow and Company, Inc., 1985), pp. 307-308.

[112] Robert Kane, *Cellular Telephone Russian Roulette* (New York, NY: Vantage Press, 2001), p. 161.

[113] Petition for Inquiry of the EMR Network, Before the Federal Communications Commission, September 25, 2001, presented by attorney James R. Hobson, Miller & Van Eaton, P.L.L.C., Washington, D.C.

Strong signals can even produce sounds inside the head that are as loud as 120 decibels, which is equivalent to the thundering roar of a commercial jet taking off. Often, over-exposed people are subject to chronic, excruciating pain, caused by these irritating noises.

I can recall numerous episodes when Steve experienced the effects of microwave hearing. One night, while lying in bed, he commented on how loud the crickets were, but I didn't hear a thing. And there were several times when he'd walk into a room and ask if I had the TV or radio on. I never did, but he was always convinced otherwise. I also remember the days and nights when he would complain of high-pitched screeching that wouldn't quit. It was intolerable and kept him bed-ridden.

These agonizing and unbearable hearing disturbances are thought to be caused by rapid brain tissue expansion. Swelling occurs in the brain because of energy absorption and intense heating caused by radiation exposure. Microwave hearing effects occur at power density levels that are significantly lower than the current U.S. safety guidelines, levels that you are regularly and chronically exposed to.[114]

After years of studying various microwave frequencies, Frey determined that today's cell phones and their transmitting frequencies "fall in the most sensitive band for the microwave hearing effect." These same frequencies are also "in the band that has maximal penetration into the head."[115]

Perceptual Concerns:

Unprovoked Feelings

Frey also recognized that unprovoked feelings could be experienced by humans who were exposed to energy at frequencies within the cell phone range. Like sounds resulting from the microwave hearing effect, feelings can be perceived in a variety of ways, as well. Such impressions can be detected as minor annoyances (such as a tingling sensation similar to that of your foot falling asleep), severe, intolerable effects (such as a brutal buffeting

[114] Lin, J. C., "On Microwave-Induced Hearing Sensation," *IEEE Transactions on Microwave Theory and Techniques* Vol. 25, No. 7, July 1977, pp. 605-613.

[115] Frey, A. H., "Headaches From Cellular Telephones: Are They Real and What Are The Implications?," *Environmental Health Perspectives,* March 1998.

of the head), or anything in between the two extremes. Feelings experienced depend solely on the signal.[116] This reinforces the previously mentioned purposes for which international militaries are integrating this source of technology into the development of non-lethal weapons.

[116] Frey, A. H., "Human Auditory System Response to Modulated Electromagnetic Energy," *Journal of Applied Physiology* Vol. 17, 1962, pp. 689-692.

CHAPTER 7

Neurological Nemeses

Numerous worldwide research efforts have determined that RF/MW radiation elicited from cell phones induces significant changes in the central nervous system. The human brain operates using complex electromagnetic signals that transmit important information from cell to cell. These signals are electrically sensitive and are adversely impacted by even the smallest doses of external EMR.

From his comprehensive compilation of available research, Dr. Neil Cherry validated the fact that there is "a very strong and coherent set of data supporting a casual [extremely significant] relationship between ELF to RF/MW exposure, including cell phone usage, and neurological illness and death."[117]

Dr. Henry Lai summarized his observation in this way: "Existing data indicate that RFR (Radiofrequency Radiation) of relatively low intensity (SAR < 2 W/kg) [much lower than current standard safety guidelines] can affect the nervous system. Changes in blood-brain barrier, morphology, electrophysiology, neurotransmitter functions, cellular metabolism, and calcium efflux, and genetic effects have been reported in the brain of animals after exposure to RFR. These changes can lead to functional changes in the nervous

[117] Cherry, Neil *"Evidence that Electromagnetic Radiation is Genotoxic: The Implications for the Epidemiology of Cancer and Cardiac, Neurological and Reproductive Effects,"* Extended from a paper presented to the conference on Possible Health Effects on Health of Radiofrequency Electromagnetic Fields, 29th June 2000, European Parliament, Brussels. p. 49. Cherry Environmental Health Consulting, http://www.neilcherry.com

system. Behavioral changes in animals following exposure to RFR have also been reported."[118]

Since the central nervous system is one of the most sensitive systems in the human body, associated abnormalities are usually the first to develop as a result of exposure.

An asterisk * continues to be used to identify symptoms which are most likely to develop within the first 3-5 years of exposure, according to the Russian Medical Literature.[119]

Delayed Reaction Time*

Slower reaction times have been identified in multiple studies as a direct consequence of the body's response to RF/MW radiation exposure. [120] Accompanying these findings is evidence that cell phone exposure delays the human "startle" response when surprised, alarmed, or taken off guard. In other words, acting quickly in situations which would normally provoke that type of response is inhibited.

This may not seem like a real concern, but consider what would happen in a dangerous situation. Suppose that, while you are driving, someone unexpectedly pulls out in front of you and cuts you off or a child runs into the road. Instead of immediately slamming on brakes, your response time is delayed. A few seconds could be the difference between life and death.[121]

This adverse effect alone could be one of the principle reasons why cell phone users have a higher than average accident rate. Research has shown that those who use cell phones while driving are 5.6 times more likely to get into an accident than those

---

[118] Lai, Henry, *"Neurological Effects of Radiofrequency Electromagnetic Radiation Relating to Wireless Communication Technology,"* Bioelectromagnetics Research Laboratory, Dept. of Engineering, University of Washington, Seattle, Washington. Paper presented at the IBU-UK Conference: Mobile Phones- Is there a Health Risk? Sept. 16-17, 1997 in Brussels, Belgium.

[119] Maisch, Don, "Biological Effects of Electromagnetic Fields on Humans in the Frequency Range 0 to 3 GHz: Summary and Results of a Study of Russian Medical Literature from 1960-1996," presented to the 10th International Montreux Congress on Stress, Montreux, Switzerland, Feb. 28-March 5, 1999. *Citizens' Initiative Omega,* http://www.grn.es/electropolucio/omega138.htm

[120] Cherry, Neil, *"Cell Phone Radiation Poses a Serious Biological and Health Risk,"* http://www.buergerwelle.de/pdf/cell_phone_radiation_poses_a_serious_biological_and_health_risk.pdf (May 7, 2001).

[121] Mitchell, C. L., *et al.*, "Some Behavioral Effects of Short-Term Exposure of Rats to 2.45 GHz Microwave radiation," *Bioelectromagnetics* Vol. 9, no. 3 (1988): pp. 259-268.

who don't talk and drive.[122] Accidents involving drivers who have an "active" cell phone in the car are also twice as likely to have a fatal outcome.[123]

Slowing or Loss of Motor Skills*

Motor skills are activities that require the effective use of skeletal muscles to perform a particular task. Motor skills employ the use of the brain, skeletal muscles, joints, and nervous system. There are two types of motor skills, gross and fine.

Gross motor skills involve large muscle movements, using the arms and legs (i.e.: walking, stepping, lifting heavy objects, and physical exercise). Fine motor skills involve small hand manipulations, with an emphasis on hand-eye coordination (writing, coloring, picking up small objects, and cutting).

A slowing or loss of motor skills is characterized by instability and a lack of coordination. It has even been established that children living near radiating towers, where wireless signals are constantly exchanged, are slower in their reaction times and have less physical endurance than children who are not exposed to the same degree.[124] A consistent drop in performance levels has also been reported in highly exposed subjects.

Memory Loss*

Memory loss, bouts of confusion, disorientation, and forgetfulness are all early warning signs of neurological damage and neurodegenerative diseases. Memory loss, both short and long term, has always been one of the most prominent symptoms of RF/MW radiation exposure and it is also found to transpire at radiation levels far below current FCC safety guidelines.[125] At a World Health Organization (WHO) sponsored symposium it was revealed that 55% of those exposed to microwave radiation experience memory loss.[126]

---

[122] Violanti, J.M. and Marshall, J.R., "Cellular Phones and Traffic Accidents: An Epidemiological Approach," *Accid Anal Prev* Vol. 28, No. 2, (1996): pp. 265-270.
[123] Violanti, J.M., "Cellular Phones and Fatal Traffic Accidents," *Accid Anal Prev* Vol. 30, No. 4, (1998): pp. 519-524.
[124] Kolodynski, A. A. and Kolodynska, V. V., "Motor and Psychological Functions of School Children Living in the Area of the Skrunda Radio Location Station in Latvia," *The Science of the Total Environment* Vol. 180 (1996): pp.87-93.
[125] Ibid.
[126] Sadcikova, M., "Biologic Effects & Health Hazards of Microwave Radiation", international symposium sponsored by WHO (World Health Organization), Warsaw, 1973. Warsaw: *Polish Medical Publishers*, , 1974, pp. 261-267.

Forgetting where you left your keys or who you were supposed to call can easily be dismissed with excuses of being stressed, too busy, or aging. When forgetfulness increases or the misplacement of objects begins to occur more frequently, it is a serious issue that should not to be taken lightly. If this condition is not addressed and exposure isn't reduced in a timely manner, memory loss can become a permanent dysfunction.

In 1994, Dr. Lai and his team were able to show that microwave irradiation had a significant impact on short-term memory. Rats that were previously able to run a maze with proficiency were no longer able to do so after being exposed to microwave radiation and their inability to recall well known territory persisted for five days, sometimes longer, even after exposure had ceased.[127] A later study, testing the effects of low-level microwave radiation on long-term memory, yielded results that validated and confirmed the previous research. Rats that were taught and had mastered a task were unable to recall what was previously learned. They were incapable of performing after being exposed to microwaves. Unexposed rats in the control groups of both studies were unaffected.[128]

Several other scientists conducting dissimilar studies arrived at the same conclusion; they proved that memory loss is unquestionably a product of RF/MW exposure.

It has also been observed that low intensities of RF radiation disrupt normal functioning of the hippocampus.[129] The hippocampus is located in the temporal lobe of the brain; it is made up of neurons and it controls learning and memory.[130] The hippocampus also determines which memories are retained and which ones are forgotten. Disruptions in this area of the brain could also be

---

[127] Lai, H., Horita A., and Guy A. W., "Microwave Irradiation Affects Radial-Arm Maze Performance in the Rat," *Bioelectromagnetics* Vol. 15, no. 2 (1994): pp. 95-104.

[128] Maisch, Don, "Mobile Phone Use: It's Time to Take Precautions," *Journal of the Australasian College of Nutritional and Environmental Medicine*, Vol. 20, No. 1, April 2001.

[129] Sage, C, "Reported Biological Effects from Radiofrequency Non-Ionizing Radiation," *Wave-Guide: Sage Associates Studies Matrix,* http://www.wave-guide.org.

[130] Hyland, G. J., "Physics and Biology of Mobile Telephone," *Lancet*, Vol. 25 (2000): pp. 1833-1836.

responsible for behavioral changes and learning difficulties, but most certainly memory loss.[131]

Another theory as to why RF/MW exposure promotes memory loss is that EEG alterations in the brain have been shown to take place at levels 10,000 times lower than what cell phone operators are exposed to. EEG modifications can persist up to one week after exposure and can easily account for memory loss.[132]

In 1999, Dr. Leif Salford, a researcher and neurosurgeon, along with his colleagues at Lund University in Sweden, found that problems with memory and its processing functions could result from the penetration of harmful substances into the blood stream through the blood brain barrier (BBB). Their research notes that diseases such as Alzheimer's and Multiple Sclerosis could have a direct link with the opening of the blood brain barrier, which occurs as a result of cell phone radiation exposure.

Increased forgetfulness and progressive memory loss characterize the early signs of these and other neurodegenerative diseases.[133]

Blood Brain Barrier (BBB) Permeability Increased

The BBB is an essential membrane made up of a thin layer of cells that surrounds the brain. It is a natural defense mechanism that acts as a filter, protecting the brain from harmful chemical and toxic invasions that can disrupt normal functioning and cause serious problems. While keeping danger out, the BBB allows necessary substances to pass through from the blood into the brain. The BBB is critical in regulating the central nervous system, so its breakdown is extremely significant and detrimental.

Cell phone microwave radiation has been proven to maximize penetration into the head and open up the BBB. This allows hazardous toxins, including the body's own albumin protein, to penetrate the brain. The unintentional opening and penetration of

---

[131] Tattersall, J. E., Scott, I. R., Wood, S. J., Nettell, J. J., Bevir, M. K., Wang, Z., Somasiri, N. P. and Chen, X., "Effects of Low Intensity Radiofrequency Electromagnetic Fields on Electrical Activity in Rat Hippocampal Slices," *Brain Res* Vol. 904 (2001): pp. 43-53.

[132] Von Klitzing, L., *"What May Be the Biological Relevance of Altered EEG-Signals in Man Induced by Pulsed EM-Fields?"* 16th Annual Bioelectromagnatics Society Meeting, June 12-17, 1994, abstract book, p. 70.

[133] Maisch, Don, "Mobile Phone Use: It's Time to Take Precautions," *Journal of the Australasian College of Nutritional and Environmental Medicine*, Vol. 20, No. 1, April 2001.

carcinogens through the BBB adversely affects the entire nervous system, provoking memory loss, headaches, and increased intracranial pressure.

Additionally, this consequence has been proven to increase the risk of developing neurodegenerative diseases, such as Alzheimer's, Multiple Sclerosis, and Parkinson's disease.[134] Further deterioration of this critical protective membrane can just as easily lead to brain damage, brain cancer and tumors.[135]

Dr. Leif Salford and his team saw the opening of the BBB after just 2 minutes of cell phone exposure.[136] This response occurred at exposure levels 4,000 times less than those considered safe by current FCC guidelines![137] Their research also reported that as exposure increased, so did the deterioration of this vital protective membrane.[138]

Headaches*

Headaches are one of the chief complaints of cell phone users. Often, they are the first symptoms to develop. Numerous reliable research studies have concluded that there is a very strong and undeniable correlation between the two. Almost 50 years ago, while researching microwave hearing effects, Dr. Allen Frey found that he, along with his human subjects, were experiencing headaches when exposed to microwave energy. Frey was the earliest pioneer to give scientific evidence to the headache phenomenon. He validated the fact that headaches are a direct result of, not just any microwave exposure, but "microwave energy exposure at approximately the same frequencies, modulations, and incident energies that present day cellular telephones emit." Since then, this observable fact has been repeatedly confirmed by a large number of worldwide studies.

---

[134] Harris, Sarah, "Now Mobiles Give You Kidney Damage," *Daily Mail,* Dec. 3, 1999.

[135] George Carlo and Martin Schram, *Cell Phones: Invisible Hazards of the Wireless Age* (New York, NY: Carroll & Graf Publishers, 2001), p. 109.

[136] Harris, Sarah, "Now Mobiles Give You Kidney Damage," *Daily Mail,* Dec. 3, 1999.

[137] Salford, L. G. , "Blood Brain Barrier Permeability in Rats Exposed to Electromagnetic Fields from a GSM Wireless Communication Transmitter," *Abstract in Proceedings of the Second World Congress for Electricity and Magnetism in Biology and Medicine*, Bologna, Italy, June 1997.

[138] George Carlo and Martin Schram, *Cell Phones: Invisible Hazards of the Wireless Age* (New York, NY: Carroll & Graf Publishers, 2001), p. 111.

Conclusive evidence proving that headaches are caused by cell phone use is substantiated in the reality that extremely small amounts of RF/MW radiation have been shown to open the BBB and affect the dopamine-opiate system in the brain. There is a large body of confirming data supporting the theory that both of these biological incidents, which can even result from brief exposure, can lead to headaches.[139]

Headaches, like other cell phone related abnormalities, have been shown to increase and intensify with use. Symptoms have been shown to compound by up to six times as usage increases from less than 2 minutes a day to 60 minutes a day. Similar results manifest when daily calls of less than 2 are compared to daily calls of 4 or more.[140]

While pain in the head is commonly referred to as a headache, what cell phone users may actually be experiencing is intracranial pressure which is a direct response to rapid brain tissue expansion. Swelling in the brain is an observable result of energy absorption and intense deep tissue heating elicited by RF/MW radiation exposure.[141]

Anxiety / Discomfort / Nervousness*

There is significant dose-response evidence from numerous studies validating abnormalities of discomfort, nervousness, and anxiety resulting from EMR exposure.[142] Anxiety, along with headaches, is another one of the first symptoms to be recognized as a result of cell phone radiation exposure. When unveiling the multitude of consequences, anxiety and headaches top the list.

Feelings of anxiety, discomfort, uneasiness, and nervous tension can stem from the fact that this unnatural, external stimulus

---

[139] Frey, A. H., "Headaches From Cellular Telephones: Are They Real and What Are The Impacts?," *Environmental Health Perspectives*, Vol. 106, No. 3 (March 1998): pp. 101-103.

[140] George Carlo and Martin Schram, *Cell Phones: Invisible Hazards of the Wireless Age* (New York, NY: Carroll & Graf Publishers, 2001), pp. 118-119.

[141] Lin, J. C., "On Microwave-Induced Hearing Sensation," *IEEE Transactions on Microwave Theory and Techniques* Vol. 25, No. 7, July 1977, pp. 605-613.

[142] Cherry, Neil "Evidence that Electromagnetic Radiation is Genotoxic: The Implications for the Epidemiology of Cancer and Cardiac, Neurological and Reproductive Effects," Extended from a paper presented to the conference on Possible Health Effects on Health of Radiofrequency Electromagnetic Fields, 29th June 2000, European Parliament, Brussels. p. 45. [Beale et al. (1997)].Cherry Environmental Health Consulting, http://www.neilcherry.com

not only increases stress, but it uncomfortably interacts and interferes with normal bodily processes and functions.

Stress

Being agitated or "stressed out" when the circumstances around you shouldn't be eliciting that type of response may not all be "in your head." Several studies have proven that cell phone radiation exposure induces stress. An increase in the molecular "stress response" has been observed in human cells immediately following cell phone exposure.[143] This is how cells respond to environmental attacks; attacks that are perceived as being damaging or life-threatening. This survival "stress response" should be yet another indication that RF/MW radiation exposure, which the body views as an adversary to fight, is harmful.

Dr. Peter French of the Centre for Immunology, St. Vincent's Hospital in Sydney, Australia, has led a number of experiments on both human and animal cell lines to uncover their response to mobile phone radiation. Through his efforts, he discovered that repeated mobile phone use induces the chronic production of stress proteins (heat shock proteins). This stress reaction elevates the risk of tumor and cancer development, speeds metastasis (the spread of cancer cells by way of the blood stream), and decreases the effectiveness of anti-cancer drugs.[144]

Exposure has also been shown to reduce the neurotransmitter, norepinephrine; low levels of norepinephrine increase stress.[145] Stress in and of itself can, and often does, attack the weakest part(s) of the body. In doing so, it can rouse an extensive array of health problems, both minor and major. Other correlating effects such as anxiety, irritability, and discomfort resulting from cell phone exposure can further aid in provoking a sense of stress (and vice versa).

---

[143] Lai, Henry, *"Biological Effects of Radiofrequency Radiation"*, Paper for the Scientific Workshop "EMF-Scientific and Legal Issues, Theory and Evidence of EMF Biological and Health Effects" in Catania, Sicily, Italy, September 13-14, 2002, organized by the Italian National Institute for Prevention and Work Safety. [De Pomerai et al. (2000, 2002)].

[144] Melbourne, Alan, *Problems with the Rationale of the Draft Standard,* http://www.ssec.org.au/emraa/rf/may.htm (May 11, 2001).

[145] Merritt, H., Hartzell, R. H., Frazer, J. W., *"The Effects of 1, 6 GHz of Radiation on Neurotransmitters in Discrete Areas of the Rat Brain,"* in C. C. Johnson and M. L. Shore ed., Biological Effects of Electromagnetic Waves, Symposium proceedings, L. Boulder, Oct, 1975.

Suicide

A number of studies have substantiated the fact that a dose-response relationship exists between increases in suicide risk and exposures to both ELF and RF/MW radiation. One such study set out to determine the risk factors of 8,190 participants - 2,842 were employees who had been occupationally exposed for between one and five years; 5,348 volunteers made up the unexposed control group. From these numbers, 536 deaths were the result of suicide, translating to a rate of over 18% in suicides of exposed workers.[146]

A similar study reported an even more worrisome suicide rate. RF exposed British radio workers and RF/MW exposed radar mechanics reflected a 53% increase in suicide; a 156% increase in suicide was found when compiling data on exposed telegraph radio operators.[147]

I can personally attest to the high level of suicide risk facing occupationally exposed workers; Steve was another statistic. When thoughts of suicide are accompanied with stress, anxiety, and depression, other recognizable symptoms of exposure, suicide risk is significantly greater.

While this research data provides strong evidence that chronic occupational exposure poses great risks to employees, what exactly constitutes "chronic exposure"? Who can accurately determine the number of minutes, the hours of talk time, or the amount of exposure to other wireless forms of communication it would take to heighten one's risk of suicide?

If the subject should ever arise, and I pray it doesn't, don't avoid confrontation. Suicide threats should be taken seriously. Discuss feelings and options. Get help. Don't delay.

Fatigue, Exhaustion*

Always being tired, never feeling well rested, or having a severe lack of energy constitutes fatigue and exhaustion. A combination of these two abnormalities is often medically termed CFS: Chronic Fatigue Syndrome. Characteristics that can accompany CFS include becoming increasingly passive or lethargic.

---

[146] Perry, F.S., Reichmanis, M., Marino, A. and Becker, R.O., "Environmental Power Frequency Magnetic Fields and Suicide," *Health Phys*, Vol. 41, No. 2 (1981): pp. 267-277.

[147] Baris, D. and Armstrong, B., "Suicide Among Electricity Utility Workers in England and Wales," *Br J Industrial Medicine*, Vol. 47 (1990): pp. 788-789.

Since the early discovery of Microwave Sickness, fatigue and exhaustion have been recognized as being an adverse health effect of RF/MW radiation exposure. Throughout the years these psychological symptoms have been confirmed and re-confirmed on tens of thousands of cell phone users. There is undeniable evidence proving that cell phone radiation causes fatigue and exhaustion. As with other symptoms, these ailments become evident and intensify with increased exposure.[148]

There are a number of factors that could contribute to this symptomology. First and foremost, when the body is under stress, whether induced by RF/MW radiation or not, it gets tired. Another contributing factor could easily stem from the fact that RF/MW radiation decreases the body's melatonin production. Melatonin is an essential hormone that, among other things, assists with the REM (rapid eye movement) sleep cycle. A reduction of melatonin not only causes the loss of essential deep sleep, but it also provokes other sleep disturbances, including insomnia. These undoubtedly result in unrest, fatigue, and eventually, complete exhaustion.

Here again, when abnormalities such as fatigue begin to develop, the majority of cell phone users tend to conjure up excuses as to the cause. They've been working too hard or there are too many things are going on. And, while these are plausible reasons for being overly tired, the truth of the matter is that they're probably not getting the body's required amount of deep sleep. Rarely is exposure from one's cell phone considered. Therefore, instead of reducing exposure, a doctor visit is scheduled and prescription drugs are administered. As you can tell by the aggressive media campaigns, sleep inducing medications are a hot commodity.

On the flip side, have you noticed the number of energy drinks and pills on the market today? Is it sheer coincidence that these energy boosters were never in such high demand before now, when exposure has all but depleted your get-up-and-go?

[148] Coghill, Roger, "Why I Believe That All These Items Should Carry a Health Warning," *Daily Mail*, July 17, 1998.

Depression

There is significant dose-response evidence that depression results from exposure to low levels of EMR.[149] Although there are different types of depression, all are characterized by intense sadness that lasts for long periods of time and interferes with normal, everyday life. If you or someone you know suffers from depression, you will most certainly agree that depression is truly a debilitating disease that not only affects the diagnosed individual, but everyone around them as well.

Anti-depressants, which are used to help people cope with depression, are very dangerous and the need for them has soared tremendously since the introduction of cell phones. The number of prescriptions given to American children alone was multiplied by ten times between 1987 and 1996. A more recent survey revealed a 50% rise in anti-depressant prescriptions given to children from 1998 to 2002. Even more concerning is that a drastic increase has taken place in children under six years of age.[150]

Concentration Difficulties* / ADD / ADHD

Concentration difficulties that are medically diagnosed as Attention Deficit Disorder (ADD) or Attention Deficit-Hyperactivity Disorder (ADHD) have never been as prevalent as they are today and prescriptions for these abnormalities are some of the most popular.

The ability to stay focused and to direct attention toward one thing at a time becomes increasingly challenged when we are exposed to low levels of RF non-ionizing microwave radiation. Several studies have concluded that cell phone and cell tower exposure significantly hinders one's capacity to fully concentrate on the task at hand.

Research has also found that children attending schools or living in close proximity to cell towers experience an elevated stage

---

[149] Cherry, Neil *"Evidence that Electromagnetic Radiation is Genotoxic: The Implications for the Epidemiology of Cancer and Cardiac, Neurological and Reproductive Effects,"* Extended from a paper presented to the conference on Possible Health Effects on Health of Radiofrequency Electromagnetic Fields, 29th June 2000, European Parliament, Brussels. p. 45. [Beale et al. (1997)]. *Cherry Environmental Health Consulting,* http://www.neilcherry.com

[150] Vedantam, Shankar, "Antidepressant Use in Children Soars Despite Efficacy Doubts", *The Washington Post*, April 18, 2004. p. A01.

of attention deficit.[151] It's distressing to realize that the younger generation is paying such a huge price for their involuntary exposure. Not only are they likely to suffer from concentration difficulties, but when accompanied with memory loss, this duo can easily lead to learning problems, stress, frustration, and a genuine, yet unnecessary, lack of success.

On October 9, 2002 twenty two German medical doctors from the Interdisciplinary Association for Environmental Medicine called for a ban on mobile phone use by small children and restrictions for teens, because the diseases they were seeing at an elevated rate had all been shown to be a direct consequence of wireless communication emissions. This group of medical professionals was collectively treating a greater number of young patients who were suffering from various neurological disorders, including those related to learning, concentration (ADD or ADHD), and behavior.[152]

Learning Disabilities

The basis upon which learning disabilities are founded is closely tied to memory loss, confusion, concentration difficulties, and behavioral problems, all of which are direct results of exposure to wireless signals.[153, 154] British military scientists, along with many other researchers, have discovered that low intensities of radio frequency radiation (RFR) disrupt normal functioning in the area of the brain that controls learning and memory.

Another reason learning disabilities are believed to exist is because exposure to microwave radiation reduces dopamine, norepinephrine, and serotonin. Dopamine is an essential neurotransmitter for learning and other cognitive abilities.[155]

---

[151] Sage, C, "Reported Biological Effects from Radiofrequency Non-Ionizing Radiation," *Wave-Guide: Sage Associates Studies Matrix,* http://www.wave-guide.org.

[152] Reported by the *EMR (Electromagnetic radiation) Network*: http://www.emrnetwork.org/news/IGUMED_enlish.pdf

[153] Tattersall, J. E., Scott, I. R., Wood, S. J., Nettell, J. J., Bevir, M. K., Wang, Z., Somasiri, N. P. and Chen, X., "Effects of Low Intensity Radiofrequency Electromagnetic Fields on Electrical Activity in Rat Hippocampal Slices," *Brain Research,* Vol. 904 (2001): pp. 43-53.

[154] Pryer, Nick, "Mobile Phones Can Affect Memory," *Associated Newspapers Ltd.,* July 16, 1998.

[155] Merritt, H., Hartzell, R. H., Frazer, J. W., *"The Effects of 1, 6 GHz of Radiation on Neurotransmitters in Discrete Areas of the Rat Brain,"* in C. C. Johnson and M.

Dizziness*

Since the discovery of Microwave Sickness, dizziness has also been recognized as one of the first symptoms to emerge as a consequence of RF/MW radiation exposure. Feelings of dizziness or vertigo remain a common complaint of cell phone users today.[156] However, as with other known symptoms, few are aware of the connection.

Sleep Impairments / Insomnia*

Sleep disturbances are frequently experienced by cell phone users along with those who live or work in close proximity to cell towers and their sites. Even low levels of EMR (electromagnetic radiation) have been shown to impact sleep patterns, sleep quality, and REM (rapid eye movement) sleep. REM sleep is essential for achieving a real sense of rest; it is the deepest form of sleep and relaxation.

You can be deprived of this essential mode of sleep for a short time, but extended periods of deprivation will cause you to be restless and irritable. You may even find that it is extremely difficult to function. Conversely, when you've had plenty of sleep, but still feel tired, it's undoubtedly due to poor sleep quality or a lack of necessary REM sleep.

Low levels of RF/MW radiation exposure causes notable reductions in melatonin and initiates the efflux of calcium ions. Melatonin is a naturally produced hormone that regulates our wake/sleep cycle and studies have concluded that there is a significant dose-response relationship between melatonin loss and sleep disturbance. However, when exposure ceases melatonin levels rise; this can help promote better sleep quality. [157]

Calcium ions are essential in transmitting nerve impulses, and after observing the abnormal behavior of calcium ions during exposure, top researcher, Dr. Ross Adey, expected the interference to

---

L. Shore ed., Biological Effects of Electromagnetic Waves, Symposium proceedings, L. Boulder, Oct, 1975.

[156] Harris, Sarah, "Now Mobiles Give You Kidney Damage," *Daily Mail,* Dec. 3, 1999.

[157] Cherry, Neil *"Evidence that Electromagnetic Radiation is Genotoxic: The Implications for the Epidemiology of Cancer and Cardiac, Neurological and Reproductive Effects,"* Extended from a paper presented to the conference on Possible Health Effects on Health of Radiofrequency Electromagnetic Fields, 29th June 2000, European Parliament, Brussels. pp. 47-48. *Cherry Environmental Health Consulting,* http://www.neilcherry.com

cause sleep pattern disruptions. The ill-suited combination of REM sleep loss, melatonin reduction, and the efflux of calcium ions results in the development of highly significant sleep impairments that could easily lead to insomnia, an abnormal inability to sleep.

Neurotransmitter Function Impairments

Neurotransmitters are biochemical substances which transmit or inhibit nerve impulses at a synapse. They are used to effectively communicate information between cells; synapses are the means by which such information is transferred.

Up to 60% of the synapses in the human body are regulated by gamma amino butyric acid (GABA). GABA is a brain chemical associated with the slowing or stopping of nerve activity and many neurological systems are regulated by GABA. According to a study conducted by Kolomytkin et al., GABA systems are very sensitive to RF/MW radiation and modifications of this brain chemical cause abnormal pathologies.[158] It has even been reported in WebMD Medical News that, "Impairment of the GABA system could overwhelm the brain with sensory information, leading to many of the behavioral traits associated with autism. Autism is characterized by communication problems, social impairment, and unusual or repetitive behaviors."[159]

Autism

Multiple epidemiological studies have revealed a dramatic increase in the incidence of Autism Spectrum disorders. According to the Center for Disease Control (CDC), in the U.S. 1 in 175 children has been diagnosed with autism. This rate has accelerated significantly from 1970 where only 1 out of 2,500 children suffered from the developmental disability. In 1999 that number rose to 1 in every 285. What began as a highly unusual disorder 38 years ago has soared to a universal malady which according to world reports,

---

[158] Cherry, Neil *"Evidence that Electromagnetic Radiation is Genotoxic: The Implications for the Epidemiology of Cancer and Cardiac, Neurological and Reproductive Effects,"* Extended from a paper presented to the conference on Possible Health Effects on Health of Radiofrequency Electromagnetic Fields, 29th June 2000, European Parliament, Brussels. p. 51. *Cherry Environmental Health Consulting,* http://www.neilcherry.com

[159] Boyles, Salynn, "Gene Interaction Linked to Autism Risk", *WebMD Medical News,* August 3, 2005.

suggests that autism accounts for as much as 45% of all new developmental disabilities.[160]

It is believed that RF/MW radiation exposure could have a substantial influence on this increased rise in autism. This could be due in part to the sensitivity of the brain chemical, GABA, along with the impairment of its system.

Brain Damage

Intelligence documents show that western governments have known that cell phone radiation causes brain damage for over 30 years, yet have hidden the facts proving it![161] Cell phone radiation seriously damages the neurons in the brain which can lead to permanent, irreversible brain damage. [162, 163]

Dr. Lief Salford, neurosurgeon and Dr. Bertil Persson, biophysicist, at Sweden's Lund University reported "highly significant evidence for neuronal damage in the cortex, the hippocampus and the basal ganglia in the brains of exposed rats". Brain damage became notably visible at a low SAR of 0.002 W/kg. "A clear dose-response relationship" was also revealed. In other words as exposure increased, so did the amount of detectable brain damage.

Likewise, Dr. Yngve Hamnerius and his team at Chalmers University of Technology in Goteborg, Sweden, observed brain damage in rabbits that had been exposed to pulsed GSM digital microwaves. Although immediate evidence was not realized, a delayed response was observed; three to four months later "morphological and biochemical changes became apparent".[164]

If early warning signs of neurological damage are ignored and exposure continues, injuries to the brain can compound and lead

---

[160] "Advice for Parents of Young Autistic Children," Autism Research Institute, Spring 2004. http://www.autism.com/autism/first/adviceforparents.htm

[161] Moran, Kathy, "Soviet Proof That Mobile Phones Do Cause Brain Damage," *Daily Express,* November 10, 1999.

[162] Salford, L., Brun, A., Eberhardt, J., *et al*., "Nerve Cell Damage in Mammalian Brain After Exposure to Microwaves from GSM (digital) Mobile Phones," *Environmental Health Perspectives*, Vol. 111 (2003): pp. 881-883.

[163] Vandervorst, Andre, *"RF/Microwave Protection,"* TUTB Newsletter, June 2003 No. 21. p. 13

[164] Salford, L., Brun, A., Eberhardt, J., et al., "Nerve Cell Damage in Mammalian Brain After Exposure to Microwaves from GSM (digital) Mobile Phones," *Environmental Health Perspectives*, http://www. ehponline.org (January 2003).

to permanent, irreversible brain damage.[165] Brain damage can be characterized in a number of ways and any brain function can be disrupted by damage. Headaches, fatigue, concentration difficulties, impaired memory, faulty judgment, depression, irritability, emotional outbursts, disturbed sleep, diminished libido, difficulty switching between two tasks, and slowed thinking are all symptoms of brain damage.

Neurodegenerative Diseases

Alzheimer's, Multiple Sclerosis, Epilepsy, Lou Gehrig's and Parkinson's disease have all been marked as neurodegenerative diseases that are significantly impacted by RF/MW radiation exposure. There is strong and relatively consistent evidence proving that a relationship does in fact exist between exposure and these particular neurodegenerative diseases. Not only is the risk for developing any one of these life altering maladies increased by exposure, but once a condition establishes itself, its distinguishing characteristics increase at an unusually progressive rate.

Each and every one of these neurodegenerative diseases involves the death of specific neurons. Medical professionals and scientists who study Alzheimer's have documented proof that high levels of amyloid beta in the brain can lead to the development of this disease. ELF can increase the amount of amyloid beta in the brain. The risk of developing Alzheimer's is also significantly increased by the penetration of harmful substances entering the brain through the BBB, as well as the decrease in melatonin production. Melatonin plays a key role in delaying the onset of a variety of neurodegenerative diseases and minimizes their severity.[166]

Alzheimer's disease has escalated considerably over the past 20 years, so much so that it has gained recognition as being one of the top ten killers in the United States.[167] On June 12, 2007, USA Today featured a front page article revealing that while Alzheimer's disease has always been hereditary, targeting the elderly, younger people in their 40's, with no family history of the disease, are beginning to be diagnosed. "Of the 5 million Americans who have been diagnosed with Alzheimer's disease, it is estimated that over a

---

[165] Vandervorst, Andre, *"RF/Microwave Protection,"* TUTB Newsletter, June 2003 No. 21. p. 13.

[166] Sage, C., *The Bio Initiative Report,* http://www.bioinitiative.org/report/docs/section_1.pdf (May 2008), p. 13.

[167] *Alzheimer's Association*, http://www.alz.org (2008).

half-million of them are under the age of 65." Researcher, Ron Brookmeyer of the John Hopkins Bloomberg School of Public Health in Baltimore, projects that 1 out of 85 people worldwide will fall victim to Alzheimer's disease in the next century![168]

Uncontrollable Shaking or Trembling*

Uncontrollable shaking and trembling is one of the most prominent symptoms of the previously mentioned neurological maladies, ALS or Lou Gehrig's disease and Parkinson's disease. Therefore, the fact that these symptoms are mentioned here should come as no surprise. Each symptom has been shown to be the direct result of various EMR exposures, including that from cell phones and cell towers. A definite dose-response relationship has also been found to exist. That is to say that increased exposure elevates risk.

Dopamine is an essential neurotransmitter in the brain that controls body movement, learning, and other important cognitive functions. There is evidence that dopamine levels decrease as a direct result of RF/MW radiation exposure and reduced levels of dopamine can produce uncontrollable muscle tremors and twitches.[169]

Seizure-like Activity / Epilepsy

Scientific research has revealed that epilepsy, characterized by seizure activity, convulsions, and periods of unconsciousness, is another neurological disorder that has been shown to have a dose-response relationship to EMR exposure. Some studies have even proposed that cell phone radiation exposure significantly increases the frequency of seizures in epileptic children.[170]

Dysesthesia

Dysesthesia is recognized as distorted or unpleasant sensations experienced by a person when their skin is touched. This has been identified in workers whose occupations exposed them to

---

[168] Fackelmann, Kathleen, "The young become the emerging face of Alzheimer's; those under 65 with the memory-robbing disease face stress of lost jobs and income," *USA Today,* June 12, 2007, A1 News.

[169] Raven, Johnson, Losos, Singer, *Biology, 7th Edition,* (New York, NY: McGraw Hill, 2005), p. 950.

[170] Thamir Al-Khlaiwi, *Omega News,* Association of Mibile Phone Radiation with Fatigue, Headache, Dizziness, Tension and Sleep Disturbance in Saudi Population, http://www.omega.twoday.net/stories/296447

radiofrequency radiation (RFR) and it is a common symptom of Microwave Sickness.[171]

Although this disorder is primarily a neurological abnormality, it will be revisited when sexual and reproductive consequences associated with RF/MW radiation exposure are discussed. Along with reduced libido and the threat of erectile dysfunction, dysesthesia inhibits the sexual experience.

[171] Hocking, Bruce, "Microwave Sickness: A Reappraisal", *Occupational Medicine,* Vol. 51 (2001): pp. 66-69.

CHAPTER 8

Other Serious System Disorders

Dr. Neil Cherry, physicist and highly respected elected official of New Zealand, has extensively studied how RF and electromagnetic radiation (EMR), including RF/MW radiation, impact the human body. Following years of investigative research, Cherry compiled thorough documentation of multiple studies specific to this topic.

On June 29th of 2000, he presented his findings to members of the European Parliament and attendees at a conference entitled, Possible Health Effects on Health of Radiofrequency Electromagnetic Fields. Cherry asserted that there are "many epidemiological studies showing dose-response relationships for cancer, cardiac, reproductive, and neurological effects." [172] In other words, these adverse health effects are subject to exposure and as exposure increases, the likelihood of incident simultaneously increases.

Cherry is not alone in analyzing the data; other experts in this field authenticate his educated conclusion. While it's recognized that exposures across the EMR spectrum, including RF/MW cell phone radiation, adversely affects the central nervous system, the cardiovascular system, and the reproductive system, evidence also demonstrates that this external energy also negatively interferes with

[172] Cherry, Neil *"Evidence that Electromagnetic Radiation is Genotoxic: The Implications for the Epidemiology of Cancer and Cardiac, Neurological and Reproductive Effects,"* Extended from a paper presented to the conference on Possible Health Effects on Health of Radiofrequency Electromagnetic Fields, 29th June 2000, European Parliament, Brussels. *Cherry Environmental Health Consulting,* http://www.neilcherry.com

the respiratory, digestive, urinary, and immune systems. Hormonal excretions are also impacted.

Cardiovascular Concerns:

Cell phone RF/MW radiation induces significant changes in the cardiovascular system.[173] Natural electric pulses that cause the heart to beat can be disrupted by a variety of electromagnetic signals. Microwaves from cell phones, wireless internet (Wi-Fi), and satellite transmissions can all impede the natural, rhythmic beat of the heart.

You may recall that melatonin is a vital hormone that is used to regulate the body's daily cycle of rest and activity. This powerful hormone also has multiple functions within the cardiovascular system. It aids in sustaining a rhythmic heart rate and, along with serotonin, regulates blood pressure. In addition, melatonin is responsible for signaling the calcium ions, which cause the heart to contract.

Exposure to all types of wireless energy decreases the production of these essential chemicals, and the results can be deadly. Inadequate amounts of melatonin and serotonin can cause the heart to slow down or speed up, thus increasing the risk of developing arrhythmia or heart disease. This disruption can also elevate blood pressure as well as trigger heart attacks.

Increases Blood Pressure

Blood pressure increases and heart rhythm alterations are proven to occur from exposures across the EMR spectrum. This abnormal functioning alone can unquestionably lead to the risk of heart attack, heart disease, and even death.

In 1998, German investigators, Braune et al., found that 35 minutes of RF exposure increased resting blood pressure.[174] Another study conducted in 1997 by Hermann and Hossman, recognized that the body's response to cell phone radiation not only increased blood

[173] Khudnitskii, S. S., Moshkarev, E. A. and Fomenko, T. V., "On The Evaluation of the Influence of Cellular Phones on their Users," *Med Tr Prom Ekol,* Vol. 9 (1999): pp. 20-24.
[174] "Mobile Phone Electromagnetic Fields Increase Resting Blood Pressure," *Lancet,* June 20, 1998.

pressure, but also resulted in the development of what could be considered high blood pressure.[175]

With these, and several studies providing convincing evidence that all RF, including that from cell phone exposure significantly elevates blood pressure, The British Stroke Association has given operators the following recommendation, "…we believe it would be sensible to minimize the risk".[176]

Altered Heart Rhythm & Rate

Dr. Ross Adey has documented evidence that cell phone radiation breaks down the binding of calcium to the surface of cells.[177] Calcium is essential for heart muscle contractions, these determine rhythm. In 1990, Schwartz et al. found that when frog hearts were exposed to RFR, at levels much less than those considered safe by U.S. standards, the movement of calcium was altered.[178] Wolke et al. discovered that calcium concentrations in the heart muscle cells of guinea pigs were also greatly affected when exposed to low levels of cell phone radiation. Calcium variations can alter heart rhythm and rate; they can also increase the risk of heart disease or induce heart attacks.[179]

Increased Risk of Heart Disease, Heart Attack & Heart Attack Mortality

In 1983 researchers Hamburger, Logue and Silverman saw a significant dose-response relationship between RF/MW radiation exposure and heart disease. Other studies, like that of Savitz et al., observed a highly significant dose-response relationship of mortality stemming from arrhythmia as it relates to heart disease and heart

---

[175] Hermann, D. M. and Hossmann, K. A., "Neurological Effects of Microwave Exposure Related to Mobile Communication," *J Neurological Science*, Vol. 152 (1997): pp. 1-14.

[176] *Microshield*, http://www.microshield.co.uk/research.html (October 2006).

[177] Keller, John, "Are They Safe?," *Wall Street Journal*, February, 11 1994.

[178] Schwartz, J. L., House, D. E. and Mealing, G. A., "Exposure of Frog Hearts to CW or Amplitude-Modulated VHF Fields: Selective Efflux of Calcium Ions at 16 Hz," *Bioelectromagnetics,* Vol. 11 (1990): pp. 349-358.

[179] Lai, Henry, *"Biological Effects of Radiofrequency Radiation",* Paper for the Scientific Workshop "EMF-Scientific and Legal Issues, Theory and Evidence of EMF Biological and Health Effects" in Catania, Sicily, Italy, September 13-14, 2002, organized by the Italian National Institute for Prevention and Work Safety.

attack.[180] The epidemiological evidence is solid. From his extensive research, Dr. Cherry concluded that, "EMR across the spectrum increases incidence and mortality from arrhythmia related to heart disease and from heart attack." [181] That is to say, that exposure from wireless communication signals increases the incidence of heart beat irregularity and death resulting from it.

Additionally, it has been reported that exposure to cell phone radiation causes red blood cells to leak hemoglobin, the red matter of the red blood corpuscles. The build up of hemoglobin is also known to cause heart disease, which is also life-threatening. [182]

Chest / Heart Pain*

Due to these abnormalities found to occur in the heart as a result of exposure across the EMR spectrum, chest and heart pain are very likely to be experienced by exposed individuals. This is not an uncommon symptom for anyone who suffers from irregular heart beats or arrhythmia, In fact, it's quite characteristic.

Pacemaker Interference

Since pacemakers operate so much like a real heart and RF/MW energy adversely interacts with the human heart, it would be relatively safe to assume that it might interfere just as easily with pacemakers. To establish relevancy, multiple studies have been performed over the years to determine what effect, if any, would take place in pacemakers exposed to cell phone radiation. Researchers have concluded that there is consistent evidence proving that radiant energy of this type does in fact interfere with pacemaker

---

[180] Savitz, D.A., Liao, D., Sastre, A., Klecjner, R.C. and Kavet, R, "Magnetic Field Exposure and Cardiovascular Disease Mortality Among Electric Utility Workers," *American Journal of Epidemiology,* Vol. 149, No. 2 (1999): pp. 135-142.

[181] Cherry, Neil *"Evidence that Electromagnetic Radiation is Genotoxic: The Implications for the Epidemiology of Cancer and Cardiac, Neurological and Reproductive Effects,"* Extended from a paper presented to the conference on Possible Health Effects on Health of Radiofrequency Electromagnetic Fields, 29th June 2000, European Parliament, Brussels. p. 52. *Cherry Environmental Health Consulting,* http://www.neilcherry.com

[182] Begich, Nick and Roderick, James, *Earthpulse Press, Inc*., "Cell Phone Convenience or 21st Century Plague?,"
http://www.earthpulse.com/products/cellphoneplague.htm (July 2004).

performance. The interference experienced in most of the studies has not been slight, but significant. [183]

Research efforts have observed rhythm slowing, heart beat acceleration, and complete stopping. Obviously, these disturbances can lead to serious medical complications, including death. Due to the severity of these findings, pacemaker recipients are strongly advised to keep wireless phones as far away from their artificial heart as possible.

To close this section, please permit me to share another personal experience. While speaking with a female travel agent in Florida, I was asked if cell phone radiation could affect the heart. The woman was asking because she had been experiencing heart problems and chest pain for quite some time.

Before answering her question, I inquired further, asking if she wore the cell phone on her body, because that could make a difference. Her response took me quite off guard as she gingerly reached down into her shirt and pulled out her phone, "Yes," she retorted, "I wear it in my bra!"

I was taken completely off guard and astonished. In response to her question I answered, "Yes, there is proof that an active cell phone that close to the heart can cause heart or chest pain as well as other serious dysfunctions." Then I strongly advised her to keep that "thing" out of her bra and get a purse to carry it in.

Reproductive Concerns:

Consequences to the reproductive system have also been found to develop from RF/MW radiation emitted from wireless communication signals. Laboratory and epidemiological studies have demonstrated a wide variety of adverse reproductive effects, ranging from a decrease in libido and sex drive to those which are much more severe. Serious reproductive disorders linked to radiation exposure include impotence or erectile dysfunction (ED), a decrease in sperm count, a reduction in sperm quality, infertility, and an increased risk of both miscarriage and birth defects.[184] Three types of

---

[183] Cherry, Neil, *"Cell Phone Radiation Poses a Serious Biological and Health Risk,"* http://www.buergerwelle.de/pdf/cell_phone_radiation_poses_a_serious_biological_and_health_risk.pdf (May 7, 2001).

[184] Cherry, Neil *"Evidence that Electromagnetic Radiation is Genotoxic: The Implications for the Epidemiology of Cancer and Cardiac, Neurological and*

cancer, which have shown to be elevated approaching significance in cell phone users, can also be considered under this heading: testicular cancer, cervical cancer, and breast cancer in both men and women.[185]

Sex Drive Reduction*

Studies have revealed that exposure to RF/MW radiation, at levels similar to those emitted by cell phones, reduce the male sex drive. Exposure induces behavioral and endocrine changes along with decreases in blood concentrations of testosterone and insulin. There appears to be a direct correlation between radiation exposure and male testosterone levels. Specifically, the greater the exposure, the more significant the decrease in testosterone released into the body's glands. Diminished amounts of testosterone reduce libido or the desire for sexual activity.[186]

In 2002, Santini et al. tested this theory to determine if similar problems existed in people residing near cell towers where chronic exposure was experienced. They discovered that those living within 300 meters (~328 yards) of mobile phone base stations frequently complained of fatigue and lacked a normal, healthy sexual urge, representative of a more significant decrease in libido than those residing farther away.[187]

Impotence / Erectile Dysfunction

Under the influence of EMF (electromagnetic fields), like those emitted from cell phones and site antennas, sexual function can also be impaired by changes in the nervous and neuroendocrine systems.[188] Since libido and testosterone levels have shown to be

---

Reproductive Effects," Extended from a paper presented to the conference on Possible Health Effects on Health of Radiofrequency Electromagnetic Fields, 29th June 2000, European Parliament, Brussels. p. 14. *Cherry Environmental Health Consulting,* http://www.neilcherry.com

[185] Cherry, Neil, *"Cell Phone Radiation Poses a Serious Biological and Health Risk,"* http://www.buergerwelle.de/pdf/cell_phone_radiation_poses_a_serious_biological_and_health_risk.pdf (May 7, 2001).

[186] Navakatikian, M. A. and Tomashevskaya, L. A., *"Phasic Behavioral and Endocrine Effects of Microwaves of Nonthermal Intensity." "Biological Effects of Electric and Magnetic Fields, Volume 1,"* (San Diego, CA: Academic Press, D. O. Carpenter (ed) 1994), pp. 333-342.

[187] Santini, R., Santini, P., Danze, J.M., Le Ruz, P. and Seigne, M., "Study of the Health of People Living in the Vicinity of Mobile Base Stations: Influence of Distance and Sex," *Pathol Biol* (Paris), Vol. 50 (2002): pp. 369-373.

[188] *Matrix & Aires:* Scientific and Production Association, New Medical Technologies Foundation. "Aires Matrix of Health Revolutionary Universal

significantly reduced due to exposure, problems such as impotence, also referred to as erectile dysfunction (ED), are likely to arise.

This problem may have existed for some men in the past, but over the last 20 years these sexual disorders have become increasingly prevalent in our society. Millions of men, and indirectly women, suffer from this dilemma. The demand for pharmaceutical drugs such as Viagra and Cialis has soared and continues to increase. It's difficult to believe that this widespread disorder, along with the growing need for aid, is sheer coincidence.

Decreased Sperm Count

Numerous international studies conducted over the past 20 years have demonstrated a continual decline in adult male sperm count. These changes are not perceived as being genetic; they are presumed to stem from environmental or lifestyle factors. It is thought that if this down turn persists at its present rate, within a relatively short period of time widespread male infertility may be witnessed.[189]

Fertility specialists at the University of Szeged in Hungary discovered a sperm count reduction of up to 30% in men who carry a cell phone on their belt or in their front pants pocket. Sperm count decreased in direct proportion to the amount of time the cell phone was next to the body, emitting its harmful rays.[190]

Fertility Reduction & Irreversible Infertility

If exposure decreases sperm count, the ability to conceive children is also reduced. In 1997 Magras and Xenos confirmed that even low doses of residential exposures, levels which are considered safe, produced observable adverse reproductive effects in mice. Those that were exposed became less productive over time and by the 5th generation the exposed mice had become completely infertile,

---

Approach to Treatment and Prevention of Diseases to Replace Out-of-Date Technologies," http://www.matrix.com.ru

[189] Shiva Dindyal: The sperm count has been decreasing steadily for many years in Western industrialised countries: Is there an endocrine basis for this decrease?. *The Internet Journal of Urology.* Volume 2 Number 1 (2004)..

[190] Fejes, Imre, et al., *"Relationship Between Regular Cell Phone Use and Human Semen Quality,"* paper presented at the 20th Annual Meeting of the European Society of Human Reproduction and Embryology, Berlin, June 29, 2004.

no longer able to produce offspring. This study clearly demonstrates a cumulative effect.[191]

Decreased Sperm Quality

While low intensities of non-ionizing RF/MW radiation have been recognized in the scientific community as adversely influencing sex drive, sperm count, and fertility, it has also been shown to decrease sperm quality. Sperm that is mediocre or inadequate in some way can jeopardize the success of creating a healthy embryo and delivering a normal, unaffected child.

In October 2006, Dr. Ashok Agarwal, Director of the Center for Reproductive Medicine at the Cleveland Clinic in Cleveland, Ohio, found a direct correlation between cell phone use and deviations in sperm quality. The data revealed evidence of highly significant sperm damage in men who exceeded 4 hours a day of cell phone use when compared to men who were on their phones less frequently.[192]

Another study conducted in 2008 by Agarwal, confirmed his previous findings. However this time, exposure levels seemed to be more relevant; instead of measuring exposure from cell phone usage near the brain where the phone is held while conversing, exposure mimicked that which would be absorbed into a man's testes when an active cell phone is carried in his front pant's pocket. This endeavor of testing close range exposure not only exhibited a decrease in sperm quality, motility, and viability, Agarwal also reported that the sperm of *all* participants displayed an average increase of 85% in free radicals. Free radicals have been linked to a reduction of sperm quality, as well as a variety of other human diseases, including cancer.

Agarwal believes that these observable findings may be the result of deep tissue heating, which is known to transpire from cell phone radiation, in the gonads. Increased temperatures can adversely

---

[191] Lai, Henry, *"Biological Effects of Radiofrequency Radiation",* Paper for the Scientific Workshop "EMF-Scientific and Legal Issues, Theory and Evidence of EMF Biological and Health Effects" in Catania, Sicily, Italy, September 13-14, 2002, organized by the Italian National Institute for Prevention and Work Safety.

[192] Wayne Rash, "Cell Phone Use Affects Fertility, Study Shows," *EWeek.com,* Oct. 27, 2006.

affect sperm cells. Testes have also been recognized as absorbing radiation more readily than other parts of the body, elevating risk. [193]

Increased Miscarriage Risk

A heightened miscarriage risk has been proven to result from microwave exposure. In a study of 6,684 physiotherapists, who had performed 3 minute diathermy treatments on patients using non-ionizing microwave radiation, a highly significant dose-response relationship was observed. The women who had been exposed to the microwaves had an astonishing 28% increase of miscarriage in their first trimester.[194]

Increased Risk of Birth Defects & Reproductive Abnormalities

DNA damage and chromosomal alterations have been shown to occur at various levels of radiofrequency exposure, including those specific to cell phones. Evidence reveals that RF/MW radiation exposure not only increases the risk of reproductive abnormalities, but it also inflates the threat of birth defects in unborn children.

U.S. scientists exposed more than 10,000 chicken embryos to cell phone radiation with seriously disturbing results. Following exposure, multiple birth defects were observed and a significant mortality rate was evident. British mobile phone specialist, Roger Coghill, said the findings are "enormously worrying."[195]

In 1991, Somosy et al. found that mouse embryos were adversely affected in much the same way. The radiation caused molecular and structural changes in their cells.[196]

Due to the deep concern of these, and other similar studies, some researchers are urging pregnant women not to use mobile phones until the risks can properly be assessed. The French

---

[193] "Cell Phones Can Affect Sperm Quality, Researcher Says," *CNN News,* September 18, 2008.

[194] Ouellet-Hellstrom, R. and Stewart, W.F., "Miscarriages Among Female Physical Therapists Who Report Using Radio and Microwave Frequency Electromagnetic Radiation," *American Journal of Epidemiology,* Vol. 138, No. 10 (1993): pp. 775-786.

[195] Coghill, Roger, "FED: Pregnant Women Warned to be Wray of Using Mobile Phones," *AAP General News,* May 1, 1999.

[196] Lai, Henry, *"Biological Effects of Radiofrequency Radiation",* Paper for the Scientific Workshop "EMF-Scientific and Legal Issues, Theory and Evidence of EMF Biological and Health Effects" in Catania, Sicily, Italy, September 13-14, 2002, organized by the Italian National Institute for Prevention and Work Safety.

government has even strongly advised pregnant women to distance their cell phones from their bellies. [197]

Respiratory Concerns:

Breathing Difficulties

RF energy also has a profound impact on breathing. Captain Paul Tyler was director of the U.S. Navy Electromagnetic Radiation Project between 1970 and 1977. In his contribution to the book, *Low Intensity Conflict and Modern Technology*, he warned that, "It has been shown that normal breathing takes place at certain frequencies and amplitudes and not at others. Animals (like humans) forced to breathe at certain unnatural frequencies develop severe respiratory distress." Frequency irregularities can produce feelings of uneasiness and anxiety, which can lead to suffocation, even resulting in death.[198]

Digestive / Gastrointestinal Concerns:

There are a few digestive disturbances which have been reported to arise as a result of RF/MW radiation exposure. They include:

Peptic Ulcers[199]

Nausea
Loss of Appetite
Vomiting
Diarrhea
Irritable Bowel Syndrome

---

[197] "Eye on Europe," *Microwave News*, Vol. 22, No. 2 (March/April 2002) p.5.

[198] "Have the Radiofrequency Weapons Been Put to Use Yet?", http://www.wealth4freedom.com/truth/12/mindcontrol.htm (November 2002).

[199] Maisch, Don, *"Submissions to Standards Australia on Adopting the ICNIRP Radio Frequency Exposure Limits for Australia and New Zealand"*. "ICNIRP RF/MW Guidelines for Australia / New Zealand" Discussion paper (A), July 24, 1998.

Urinary Concerns:

Kidney Stone & Kidney Damage Development

The kidney and liver are more vulnerable to cell phone microwaves than other vital organs in the body, aside from the brain. All three readily absorb RF/MW radiation, thereby leading to the possibility of complications, problems, and even organ damage. As mentioned under Cardiac Concerns, the leaking and build up of hemoglobin is a reactive response to wireless energy. Not only is this adverse reaction known to cause heart disease, it is also recognized as promoting the development of kidney stones.

One of the primary reasons it is best to avoid wearing an "active" cell phone on your belt or in your pants pocket is because of its close proximity to both the kidney and the liver. The testes are also especially susceptible in this area of the body. [200]

Hormonal Concerns:

Hormones that regulate and perform specific, necessary bodily tasks become impaired when exposed to low levels of radiation across the EMR spectrum. Detrimental exposures have been shown to stem from a wide variety of sources, including emissions from high voltage wires, radio and TV antennas, cell phones and cell towers, Wi-Fi, satellite, and radar signals. Regardless of the source, there is little difference in the body's response.

Hormonal excretions that have repeatedly been shown to adversely be affected by such exposure include those of melatonin, testosterone, insulin, thyrotropin, and cortisol. The obstruction or fluctuation of any one or more of these five essential hormones, can lead to a multitude of health problems. However, the reduction of melatonin is the most important, because it can threaten your life.

---

[200] Begich, Nick and Roderick, James, *Earthpulse Press, Inc*., "Cell Phone Convenience or 21st Century Plague?," http://www.earthpulse.com/products/cellphoneplague.htm (July 2004).

Melatonin Reduction

In the book, *Your Body's Natural Wonder Drug,* Professor Russell Reiter, Ph.D., one of the world's leading medical researchers on melatonin, identifies the various functions of this hormone as: regulating the body's wake/sleep cycle, assisting with healthy sleep, maintaining normal body temperature, reducing cholesterol, and lowering blood pressure. Melatonin is also responsible for triggering several secondary functions, including sending calcium ions to flood the heart causing it to contract and helping it to maintain regular, rhythmic beats. Melatonin strengthens the immune system and is the body's most powerful antioxidant, protecting cells from cancer-causing agents like free radicals. In addition, melatonin is recognized as a mood stabilizer, and has even been considered an anti-stress hormone.

With so many vital and life-sustaining tasks, it becomes apparent that a decrease in the body's production of melatonin, as a result of EMR and wireless exposure, significantly compromises health and the human physical condition.

Testosterone Reduction

As previously referenced under Reproductive Concerns, studies reveal that cell phone radiation reduces the excretion of the hormone testosterone, which regulates the sexual function in men. Low levels of this essential hormone significantly diminish libido and can cause impotence or erectile dysfunction.

Insulin Reduction

Insulin is a hormone which controls blood glucose levels and has extensive effects on metabolism and other body functions. The production of insulin has also been shown to be reduced as a result of RF/MW exposure. One study found a significant insulin decrease of 26% when exposed to levels considered safe by the FCC. [201]

Diabetes is a real health concern when the body produces less insulin than what is needed for proper growth and energy.

[201] Sage, C, "Reported Biological Effects from Radiofrequency Non-Ionizing Radiation," *Wave-Guide: Sage Associates Studies Matrix,* http://www.wave-guide.org.

Diabetes is a chronic condition that has impacted the lives 23.6 million Americans. It is the sixth leading cause of death in the U.S.[202]

Thyrotropin Reduction

Thyrotropin, a thyroid-stimulating hormone, regulates several metabolic and behavioral parameters. It controls such activities as food consumption, physical movement, and has qualities which act as a natural antidepressant. The reduction of this essential hormone can promote eating disorders, encourage fatigue, and can even evoke depression. Nausea, fatigue, and depression are all common subjective complaints of individuals exposed to both chronic and acute levels of RF/MW radiation.[203]

Cortisol Increase

Human subjects demonstrated a transient increase in blood cortisol when exposed to cell phone radiation.[204] Cortisol is a hormone that is released into the bloodstream whenever the body perceives and reacts to stress. It is responsible for stimulating the conversion of proteins to carbohydrates, raising blood sugar, and promoting glycogen storage in the liver.[205] Chronic elevations of this stress hormone influence mood and can induce depression, it also weakens the immune system.[206]

Immune System Concerns:

Biological effects from EMF exposure, like that of cell phones and their antennas, have been shown to interfere with normal

---

[202] *American Diabetes Association*, American Diabetes Association Health Reform Priorities, http://www.diabetes.org/advocacy-and-legalresources/HRP-executive-summary.jsp

[203] Gary, K. et al. J. *Pharmacol. Exp. Ther.* 305, 410 (2003); Sattin, A. J. *ECT.* Vol. 15, (1999): pp. 76 Steward, C. et al. *Neuroreport*, Vol. 14, (2003): pp. 687.

[204] Lai, Henry, *"Biological Effects of Radiofrequency Radiation",* Paper for the Scientific Workshop "EMF-Scientific and Legal Issues, Theory and Evidence of EMF Biological and Health Effects" in Catania, Sicily, Italy, September 13-14, 2002, organized by the Italian National Institute for Prevention and Work Safety.

[205] *Biology Online,* http://www.biology-online.org

[206] Het, Serkan, MSc, and Wolf, Oliver T. PhD, University of Bielefeld, "Mood Changes in Response to Psychosocial Stress in Healthy Young Women: Effects of Pretreatment with Cortisol," *Behavioral Neuroscience,* Vol. 121, No. 1.

immune system functioning.[207] The overall impact these external stimuli have on the human body is subtle, yet devastating. The internal transformations that occur from exposure not only affect cells and tissue in a variety of ways, but they also play a key role in your ability to fight off and repair damage. Like so many other related symptoms, this occurrence takes place at levels well below those that the U.S. Government accepts as being safe. [208]

The critical malfunctions that threaten the immune system and one's overall well being can be primarily attributed to the fact that exposure has been proven to alter calcium ions and significantly reduce melatonin. Both of these abnormalities not only contribute to the development of a weakened immune system, but they also have other serious implications that create an adverse domino effect of threatening consequences.[209]

Additionally, there is substantiated evidence that, since the immune system senses danger and reacts accordingly to RF exposure, inflammatory and allergic reactions can also result. Chronic excitation of this nature can lead to immune dysfunction, chronic allergic responses, inflammatory disease, and ill health. [210]

Hodgkin's disease

Hodgkin's disease, sometimes referred to as Hodgkin's Lymphoma, is a cancer of the lymphatic system, which is part of the immune system. A number of heavy cell phone users who admitted to being on their phones for a minimum of two hours a day, developed Hodgkin's disease in their neck lymph glands. The disease appeared on the same side that users reported holding their

---

[207] *Matrix & Aires:* Scientific and Production Association, New Medical Technologies Foundation. "Aires Matrix of Health Revolutionary Universal Approach to Treatment and Prevention of Diseases to Replace Out-of-Date Technologies," http://www.matrix.com.ru

[208] Lai, Henry, *"Biological Effects of Radiofrequency Radiation",* Paper for the Scientific Workshop "EMF-Scientific and Legal Issues, Theory and Evidence of EMF Biological and Health Effects" in Catania, Sicily, Italy, September 13-14, 2002, organized by the Italian National Institute for Prevention and Work Safety.

[209] Cherry, Neil "Evidence that Electromagnetic Radiation is Genotoxic: The Implications for the Epidemiology of Cancer and Cardiac, Neurological and Reproductive Effects," Extended from a paper presented to the conference on Possible Health Effects on Health of Radiofrequency Electromagnetic Fields, 29th June 2000, European Parliament, Brussels. p. 56.

[210] Sage, C., *The Bio Initiative Report,*
http://www.bioinitiative.org/report/docs/section_1.pdf (May 2008), p. 18.

phones while talking.[211] As Hodgkin's disease progresses, it compromises the body's ability to fight infection.

[211] Philips, Alasdair, "Adverse Health Concerns of Mobile Phones", *Australia's Powerwatch Network,* http://frontpage.simnet.is/vgv/alist.htm

CHAPTER 9

Genotoxic Damage & Cancer

Ever since 1993, when the cell phone industry was hit with its first cancer lawsuit, consumers have questioned whether or not cell phone use causes cancer. While it should come as no surprise that industry-funded studies continue to present inconclusive evidence of genotoxic damage and cancer risk, substantiated evidence of these adverse health effects continue to emerge from independent endeavors, generating an affirmative response to this lingering concern.

A long term research effort, which went by the name REFLEX (Risk evaluation of potential environmental hazards from low-energy electromagnetic field EMF exposure using sensitive in-vitro methods), was initiated to evaluate the risks and potential health hazards of environmental RF and EMF exposure, specifically from cell phones and their masts. Twelve scientists from seven European universities and organizations participated in the study, which ran from February 2000 through May 2004. The published findings revealed numerous atypical changes in biological functioning.

The abnormalities which relate to genotoxic damage and cancer formation found to exist in the REFLEX study are as follows:

- "Gene mutations, cell proliferation, and apoptosis are caused by or result in altered gene and protein expression profiles. The convergence of these events is required for the development of all chronic diseases."

- "Genotoxic effects and a modified expression of numerous genes and proteins after EMF exposure could be demonstrated with great certainty."

- "RF-EMF produced genotoxic effects in fibroblasts, HL-60 cells, granulosa cells of rats, and neural progenitor cells derived from mouse embryonic stem cells."

- "Cells responded to RF exposure between SAR levels of 0.3 and 2 W/Kg with a significant increase in single and double-strand DNA breaks and in micronuclei frequency."

- "In HL-60 cells an increase in intracellular generation of free radicals accompanying RF-EMF exposure could clearly be demonstrated."

- "The induced DNA damage was not based on thermal effects and arouses consideration about the environmental safety limits for ELF-EMF exposure." [212]

Dr. Graham Blackwell gave an account of this study in his article entitled The REFLEX Report. His statement read: "Based on the methodology used and the data obtained in the REFLEX study, the findings on genotoxicity caused by RF-EMF are hard facts."

Chromosome / DNA Damage

Numerous studies have revealed that chromosomes, the building blocks for DNA, are damaged when exposed to RF/MW radiation. Damaged chromosomes change the hereditary messaging of an organism. DNA damage alters the genetic code for growth and development. It also changes cells and diminishes their ability to perform basic functions. DNA damage transpires in a variety of ways; some even occurs naturally.

If new damage takes place before preexisting damage has been given adequate time to repair, injuries compound and negative consequences become elevated and increasingly obvious. Adverse effects which can occur as a result of DNA damage is deterioration of the organ(s) being attacked, the development of cancer, mutations,

[212] Sage, C., *The Bio Initiative Report,* http://www.bioinitiative.org/report/docs/section_1.pdf (May 2008), pp. 16-17.

birth defects, immune system impairments, and other serious health complications.[213]

To make matters worse, not only has it been confirmed that cell phone radiation causes DNA damage, it has also been recognized that this same exposure reduces the cells' ability to repair any preexisting affliction.[214]

While these health conditions and malformations may not have a significant affect on you, if not adequately repaired, they, along with their associated abnormalities, will be passed down through the generations. Irregular genetic coding will be transferred first to your children. Then your children's damaged DNA will compound with yours and be passed on to your grandchildren. From there the domino effect continues.

This snowball of consequences isn't likely to change in the near future if this vicious cycle of increased technological exposure continues. Each generation will be faced with increased difficulty, fighting the odds of being born healthy and free of complications.

At this point it may be helpful to understand the domino effect that the reduction of melatonin has on chromosome and DNA damage. Cell phone radiation significantly reduces melatonin and the reduction simultaneously decreases the amount of antioxidants that are released into the body, causing free radicals to multiply. Instead of having ample amounts of melatonin to adequately protect the body from these harmful agents, free radicals have no restraints and actively seek to damage cells and destroy DNA.

Knowing that this type of damage occurs, whether related to reduced levels of melatonin or not, proves that cell phone radiation exposure is not only genotoxic, but carcinogenic, as well.

Gene Transcription Activity Altered

A number of scientific experiments have provided evidence that RF/MW radiation at cell phone frequencies significantly enhances and alters proto-oncogene activity.[215] Proto-oncogenes are normal genes that promote cell division.

---

[213] George Carlo and Martin Schram, *Cell Phones: Invisible Hazards of the Wireless Age* (New York, NY: Carroll & Graf Publishers, 2001), pp. 20, 63.

[214] Maisch, Don, "Mobile Phone Use: it's time to take precautions," *Journal of the Australasian College of Nutritional and Environmental Medicine*, Vol. 20, No. 1, April 2001.

[215] Goswami, P. C., Albee, L. D., Parsian, A. J., Baty, J. D., Moros, E. g. Pickard, W. F., Roti, J. L. and Hunt, C. R., "Proto-oncogene mRNA Levels and Activities of Multiple Transcription Factors in C3H 10T 1/2 Murine Embryonic Fibroblasts

Over 50 different proto-oncogenes are at work in the human body. They function as receptors and signalers for growth factors that stimulate the production of numerous essential proteins. Alteration of proto-oncogene activity can lead to mutations that convert normal proto-oncogenes into abnormal oncogenes. Since proto-oncogenes promote cell division, once they are mutated into oncogenes, they similarly promote abnormal cell division. Excessive cellular proliferation of this type promotes rapid cancer growth.[216]

Cellular Calcium Ions Modified

EMR, across the spectrum, alters calcium ion homeostasis in cells. Calcium is vital in normal cell functioning and survival. Calcium ions are extremely important, because they initiate several of the bodily functions discussed in previous chapters. They play a fundamental role in regulating the GABA neurotransmitter, melatonin production, DNA synthesis, cell death, chromosome aberrations, gene transcription, protein expression, immune system competence, heart rhythm, reproduction, and the nervous system.

Since calcium ions have so many essential responsibilities, calcium efflux in cells can wreak havoc on the body by imposing a wide variety of adverse health effects in any one or more of the previously mentioned areas.

Stress Response Enhanced

The cells of nearly every life form on earth respond to environmental attacks similarly. When life-threatening danger is sensed, they resort to a mode of protection and self-preservation. This survival "stress response" produces stress proteins, also known as heat shock proteins. Numerous environmental hazards, such as toxins, chemicals, lack of oxygen, and extreme heat, cause cells to respond in this manner. Scientists have discovered that cells behave in this same fashion when they are exposed to low levels of ELF and RF. An increase in the molecular stress response has been observed in cells immediately following cell phone exposure.[217]

Exposed to 835.62 and 847.74 MHz Cellular Telephone Communication Frequency Radiation," *Radiat Res* Vol. 151 No. 3 (1999): pp. 300-309.

[216] Raven, Johnson, Losos, and Singer, *Biology, 7th Edition*, (New York, NY: McGraw Hill, 2005). p.416.

[217] Lai, Henry, *"Biological Effects of Radiofrequency Radiation",* Paper for the Scientific Workshop "EMF-Scientific and Legal Issues, Theory and Evidence of EMF Biological and Health Effects" in Catania, Sicily, Italy, September 13-14,

When normal proteins turn into heat shock proteins, they are altered and can eventually lose their defensive function. Even at levels considered safe by U.S. standard setters, RF/MW radiation induces the development of irregular heat shock proteins. This repeated response can cause cells to become cancerous.[218]

Dr. Peter French of the Centre for Immunology, St. Vincent's Hospital in Sydney, Australia, has led multiple experiments on both human and animal cell lines to uncover their responses to cell phone radiation. French and his team validated the fact that exposure to mobile phone radiation can elicit cancer. This conclusion was derived at after observing that repeated mobile phone use induces the chronic production of heat shock proteins without significantly generating heat. The increase of heat shock proteins elevates the risk of tumor and cancer development, speeds metastasis (the spread of cancer cells by way of the blood stream), and decreases the effectiveness of anti-cancer drugs.[219]

Significant Promotion of Multiple Cancers

Significant dose-response relationships have repeatedly been shown to exist between RF/MW radiation exposure and all types of cancer. Multiple research efforts show that brain tumors, leukemia, and lymphoma are especially RF sensitive.[220] Evidence of these occurrences has been demonstrated at current residential exposure levels, those which are presumably safe by U.S. government standards.[221] In other words, cell phone users aren't the only ones being affected. Reports also confirm that increases in total mortality rate exist from these exposure-induced cancers.

2002, organized by the Italian National Institute for Prevention and Work Safety. [De Pomerai et al. (2000, 2002)].

[218] Maisch, Don, "Mobile Phone Use: it's time to take precautions," *Journal of the Australasian College of Nutritional and Environmental Medicine*, Vol. 20, No. 1, April 2001.

[219] Melbourne, Alan, "Problems with the Rationale of the Draft Standard", http://www.ssec.org.au/emraa/rf/may.htm (May 11, 2001).

[220] Cherry, Neil *"Evidence that Electromagnetic Radiation is Genotoxic: The Implications for the Epidemiology of Cancer and Cardiac, Neurological and Reproductive Effects,"* Extended from a paper presented to the conference on Possible Health Effects on Health of Radiofrequency Electromagnetic Fields, 29th June 2000, European Parliament, Brussels. p.44

[221] Cherry, Neil, "Health Effects Associated with Mobile Base Stations in Communities: the need for health studies," http://www.mapcruzin.com/radiofrequency/cherry/neil_cherry1.htm (June 8, 2000).

Although no adequate long term studies have been conducted on cell phone users and cancer, because consumer use is still considered somewhat short term, Australian studies on laboratory animals have revealed some insightful information. Mice exposed to cell phone radiation for 9-18 months developed twice as many tumors as those who weren't.[222] Other scientists found that 18 irradiated rats developed malignant tumors from exposure as compared to only 5 rats in the unexposed control group.[223]

Prompted by former statistics and a Swedish study conducted in 2000, confirming evidence of increased brain tumor risk on the side of the head where cell phones are held, the World Health Organization (WHO) requested that a multi-national study on the subject be conducted. Dr. Lennart Hardell, from the Oncology Department at Orebro, in Sweden, headed the effort.

From the WHO recommended follow-up study, Hardell was able to reconfirm and validate conclusions from other previous research efforts. Across the board it was determined that cell phone users do have a greater risk of developing a brain tumor on the same side of the head that the handset is held, than on the opposite side, where exposure is not as intense. According to the study, the risk was 2.4 times greater, thus, restituting the fact that cell phone use does cause cancer. [224]

To address the global uncertainty of this relationship between cell phone use and brain tumor development, 14 scientists, public health officials, and public policy experts composed the BioInitiative Report. This report was a concentrated effort to extract and interpret all available, pertinent data gathered from years of research and multiple worldwide studies. The extensive, in depth undertaking revealed that cell phone users of 10+ years are without a doubt posed with a higher risk of developing brain tumors as well as acoustic neuromas. However, the increased threat varies depending on how the phone is used. If you alternate head sides while talking on your cell phone, there is a 20% danger of developing a brain

---

[222] Fist, Stewart, "Cell Phones and Cancer," *The Australian Newspaper*, May 5, 1997.

[223] Foster K. R. and Guy, A. W., "The Microwave Problem," Scientific American Vol. 255, No. 3 (September 1986): pp. 32-39.

[224] George Carlo and Martin Schram, *Cell Phones: Invisible Hazards of the Wireless Age* (New York, NY: Carroll & Graf Publishers, 2001), pp. 168-177.

tumor. Conversely, if you don't rotate sides, your brain tumor risk increases to 200%. [225]

Leukemia

Residential studies, focusing on the effects of RF/MW radiation from cell towers, have been performed throughout the world and every study has found a significant increase in both adult and childhood leukemia in exposed populations. Leukemia mortality rates were also higher. [226] Research efforts have revealed that every one who works, resides, or spends a large majority of time within five miles of a site is adversely affected. Those residing closest to the radiating antennas are exposed to the strongest signals, thereby experiencing the greatest detriment. Distance reduces risk.

Children are much more susceptible to microwaves than adults; therefore their risk of developing leukemia is much higher. In an effort to conceal the accuracy of incriminating findings, which have consistently shown elevated levels of childhood leukemia as a result of various RF exposures, studies bought and performed by interested parties, who benefit from a "no effect" result, have recruited older children as participants. Since younger children are more vulnerable to the effects of radiation, operating in this manner skews the outcome so risk levels do not reach "statistical significance". In doing this, the results are more acceptable to everyone: those funding the study, the researchers, and the general public.

Acoustic Neuroma

Acoustic neuroma is a rare, non-cancerous tumor that impairs the hearing nerve. Documented cases are becoming more common and rates have continued to rise in conjunction with the use of cell phones. Those who have been using a cell phone for 3+ years have a 30%-60% chance of acquiring acoustic neuroma.[227] Further, if

---

[225] Sage, C., *The Bio Initiative Report,* http://www.bioinitiative.org/report/docs/section_1.pdf (May 2008), p. 9.

[226] Cherry, Neil *"Evidence that Electromagnetic Radiation is Genotoxic: The Implications for the Epidemiology of Cancer and Cardiac, Neurological and Reproductive Effects,"* Extended from a paper presented to the conference on Possible Health Effects on Health of Radiofrequency Electromagnetic Fields, 29th June 2000, European Parliament, Brussels. pp. 36-37.

[227] George Carlo and Martin Schram, *Cell Phones: Invisible Hazards of the Wireless Age* (New York, NY: Carroll & Graf Publishers, 2001), p. 170.

a cell phone is used primarily on one side of the head, the risk increases to 240%. For cordless phones, the risk is 310%.

Rapid Cancer Growth

It has been established through a number of studies that the cell proliferation of mutated oncogenes from cell phone radiation, accelerates cancer growth.[228]

Drs. Czerska, Casamento, Ning, and Davis of the FDA, observed the rapid multiplication of human cancer cells when they were exposed to a waveform identical to that used in digital cellular phones.[229]

Further evidence supporting this phenomenon, revealed that radio waves from mobile handsets not only cause cancerous cells to grow at an unusually fast rate, aggressive cell proliferation continues even after exposure has stopped.

Russian and Italian researchers have arrived at this astonishing conclusion that "a few minutes of exposure to cell phone type radiation can transform a 5% tumor into a 95% active cancer!"[230]

Deceptive Studies

Uncertainty and controversy continue to test the link between cell phone use and cancer. On one hand you have leading research experts who have, independently from each other, proven that cell phone radiation causes DNA damage. Evidence of this damage, represented by micronuclei in exposed human blood cells, is an unmistakable diagnostic indicator used by medical professionals to determine if a patient is posed with a high risk of developing cancer or tumors. On the other hand, you have studies proving no effect. Let's take a closer look.

Between 1982 and 1995, one of the biggest cancer studies was conducted. Over 420,000 Danish mobile phone users participated; of those, the majority had only been using their phone for three years and only several thousand had over ten years of use.

---

[228] Raven, Johnson, Losos, and Singer, *Biology, 7th Edition*, (New York, NY: McGraw Hill, 2005), p.416.

[229] E.M. Czerska, J. Casamento, J. T. Ning, and C. Davis, *"Effects of Radiofrequency Electromagnetic Radiation on Cell Proliferation,"* Abstract presented on February 7, 1997 at the workshop 'Physical Characteristics and Possible Biological Effects of Microwaves Applied in Wireless Communication, Rockville, MD.

[230] Woollhams, C., "Are Mobiles a Health Hazard?", *Police Magazine,* December 2002.

While this long term study appeared to be legit, it was deceptive. Being fully aware that it normally takes more than ten years for cancer to develop, the outcome of this industry-funded study was highly predictable. It boasted of showing no adverse health effects or cancer development. When the exciting news of "no cancer risk from cell phone use" was disclosed to the world, the critical data of having based their study on short term usage was never mentioned.

Likewise, other seemingly valid studies, performed by credible sources, have been based on short term usage and therefore report no cancer risk. Two U.S. epidemiological efforts fall into this category. The first was conducted in 2001 by the National Cancer Institute and the second was conducted by the American Health Foundation.

The National Cancer Institute reported no significant increase in brain tumor after reviewing 782 brain tumor cases. However, of these, only 52 had used a mobile phone for over 3 years and only 35 of them confessed to having been on their phone for more than 15 minutes a day.

Joshua Muscat, who led the study for the American Health Foundation, claimed that, "the data showed no correlation between the use of cell phones and the development of brain cancer". What he didn't expose was that of the 469 brain tumor cases, the average cell phone usage was 2.8 years.

As you can see, although these findings are being reported by reliable sources, the basis upon which they are making their claims are not only irrelevant, they're unreasonable and deceptive.[231]

[231] Maisch, Don, "Mobile Phone Use: it's time to take precautions, 2001. Reprinted from *Journal of the Australasian College of Nutritional and Environmental Medicine,* Vol. 20, No. 1, April 2001.

CHAPTER 10

Tower Trauma

After learning that a direct correlation exists between RF/MW radiation and all types of cancer at current residential exposure levels, it becomes apparent that the sources emitting this harmful energy into our environment are making people sick. Not only are there increases in cancer because of this carcinogenic irritant, all of the symptoms of Microwave Sickness are similarly escalating. Unfortunately, whether you're a cell phone user or not, you are under attack; constantly being bombarded by RF/MW radiation emissions from cell towers, their sites, and antennas. There are so many of these radiating apparatuses, that it's virtually impossible to run or hide from their microwave signals.

Due to the vast number of these signaling masts and their counterparts (lobes and panels which are attached to the top of buildings, water towers, etc.), emissions radiate through every body within signal range. In other words, every person within a 5-mile radius of the source, or in the same range of multiple sources, is chronically being irradiated, 24 hours a day, 7 days a week, and 365 days a year. However, cell phone users endure a more intense assault when their wireless device is "on", because not only is their body responding to the involuntary irradiation of nearby signals, increased doses of microwaves are constantly being transmitted between your phone and your service provider's nearest base station.

Tower emissions in the U.S. are higher than any where else in the world, with the exception of the United Kingdom. For example, U.S. towers are allowed to emit 5800 times more RF/MW

radiation than similar base stations in Salzburg, Austria. [232] Now that's a point to ponder. If Austria's towers serve the same fundamental purpose at significantly reduced levels of radiation, then why are Americans being exposed to so much more radiation?

Microwaves from cell towers affect us in much the same way as those from cell phones. The only difference is that the RF/MW radiation from cell sites is absorbed by the entire body rather than being concentrated and focused directly at your head. And although the tower's signal strength is substantially stronger than the signal strength from your cell phone, the non-ionizing radiation absorbed into the body as a whole, can more easily and effectively dissipate the deep tissue heating effect which results from this type of exposure. While cell phone operators seem to be willing to accept some degree of undisclosed risk in regards to their wireless communication decisions, those residing or working in close proximity to cell towers are not so privileged. Since the majority of people remain entirely unaware of any health related risks associated with these unsightly monstrosities, they cannot exercise any options relating to exposure. Instead, they stand idly by being irradiated.

Cellular communication tower sites are strategically placed within five miles of one another. While initially this may not sound like it would equate to many towers, it does when you consider that every single service provider in the area has to have its own network. In large metropolitan areas there can be several service providers, and with each needing its own network, that adds up to a lot of towers. Additionally, each network has to position its towers within communication range and line of site of each other in every direction. It's seriously disturbing when you begin to realize the tremendous number of cell sites you are being impacted by in the areas where you live, work, and play.

The good news about cell towers being placed close together is that they don't need to transmit as much energy as towers which are farther apart. Reduced power means that absorption potential is also lessened. The bad news is that, in order for numerous service providers to accomplish the goal of a 5-mile radius, towers must be placed in close proximity of one another or site owners can lease space on the site they are currently using to competing providers. Evidence of service provider cooperation can be observed whenever

[232] Brown, Gary, *Wireless Devices, Standards, and Microwave Radiation in the Education Environment,* http://www.emfacts.com/wlans.html, (October 2000).

you see multiple levels of omni-directional transceivers in the form of panels, cones, drums, lobes, or antennas circling the top of tower structures. Additional signal facilitators increase exposure as well as absorption potential.

Tower Exposure Studies

Universally, via numerous global studies, conducted by multiple independent researchers and governments, two very important facts have repeatedly been confirmed. The first is that RF/MW radiation emissions from cell towers around the world exhibit a consistent and very significant dose-response relationship between dozens of neurological symptoms and cancer development. Health problems and complaints, which precede cancer, are inevitable as they escalate in occurrence and severity over time in residents living near cell towers. Comparisons made between cell site radiation exposure patterns and residential cancer patterns systematically correlated, proving that higher cancer rates exist in residents living closest to cell towers. Mortality rates have also been shown to be extremely significant; more than a doubling of natural numbers.

The second confirmed fact is that those who live closest to the radiating sites are posed with the greatest threat. The farther you reside from a cell tower, the safer you are. Distance has continually proven to be the one determining factor between residential levels of exposure and health risk.

After studying a compilation of multiple residential epidemiology studies, research expert Dr. Neil Cherry made some presumptions about the unwavering results. "Cell sites will probably acutely increase miscarriage, depression, suicide, sleep disturbance, and chronically increase rates of cancer, many diseases, significant neurological and cardiac diseases and death." He goes on to say, "The problems are going to increase unless rapid, drastic and determined moves are made to reverse the trend and only install new sites in locations that produce extremely low mean residential exposures."[233]

---

[233] Cherry, Neil *"Evidence that Electromagnetic Radiation is Genotoxic: The Implications for the Epidemiology of Cancer and Cardiac, Neurological and Reproductive Effects,"* Extended from a paper presented to the conference on Possible Health Effects on Health of Radiofrequency Electromagnetic Fields, 29th June 2000, European Parliament, Brussels. p. 56.

Over the past 5+ years, as concern surrounding these questionable radiating devices has escalated, residents of various communities have tried to fight the erection of cell towers around their homes. Although admirable, such efforts remain unsuccessful because of the 1996 Telecommunications Act.

The 1996 Telecommunications Act

In order to overcome potential problems that could interrupt the steady and rapid erection of cell towers throughout the nation, the cellular industry established the 1996 Telecommunications Act. This act became law on February 8, 1996. It was devised to significantly restrict the ability of local communities, authorities, and residents to resist the placement of cell towers, especially where health related issues were concerned.

As you recall, the U.S. Government does not govern the cell phone industry, the industry governs itself. Therefore it possesses the same rights and freedoms as utility companies. Service providers can place and position their cell towers and counterparts wherever they want them, without restriction, except on private property where a contractual agreement for lease does not exist. The industry is also its own final authority and even though they are supposed to abide by set guidelines, the FCC has admitted that it simply doesn't have the manpower to police all of their efforts. Instead, the government empowers and trusts the cellular industry to conduct its own monitoring of tower and phone emission levels.

The Act also limits the FCC's power to intervene when local communities or authorities object to tower placement. Instead of listening to or effectively addressing legitimate concerns, the service provider pacifies disgruntled residents by allowing them to choose from a number of tower construction options.[234] In doing this, they can eliminate the "eye sore" issue, but little else.

In order to mask their identity, cell towers are being hidden on rooftops and above water towers; they are being discreetly housed inside flag poles, church steeples, bell towers, crosses, silos, and clock towers. They are also being concealed in road signs, commercial signs, telephone poles, and billboards. Cell towers are even made to resemble and blend in with the tall pines of Northern

[234] Kipp, Vicki. (May 2001). *"Tower Industry Part 5 – Tower Location,"* Society of Broadcast Engineers Newsletter.

California, the palm trees of Southern California, and the Giant Saguaro cactuses of Arizona. There is virtually no limit as to how these cell sites are being hidden and disguised.

In an effort to establish just how effective the Telecommunications Act is, allow me to share another personal experience. Due to his long term exposure, my late husband Steve, like hundreds of thousands of other normal, healthy people worldwide, had developed a relentless sensitivity to EMR and RF energy.

After finally connecting his numerous symptoms and the development of brain damage to Steve's occupational exposure of RF/MW radiation, we realized the debilitating impact that the emanating microwaves from nearby cell towers had on him and we were deeply concerned. He had such a heightened sensitivity to that type of energy that whenever he was in close proximity of a site for more than twenty minutes, his face would turn bright red, he would become extremely irritable, and his thought and communication processes would completely shut down. At that time, he was unable to comprehend that which was being said and he was unable to respond. Episodes like these, of such intense exposure, would keep him bedridden for days. I was extremely thankful that we lived in a fairly remote area where nearby exposure was minimal.

One afternoon at a local post office I was talking with the postmaster about Steve's condition and his odd response to cell towers. She was familiar with and empathetic to our situation. On that day she regrettably gave me some very upsetting news; she told me that the owner of the property on which the post office sat, had signed a contract with AT&T to lease them space for a cell tower. The pending location was just a stone's throw away from our newly constructed, custom designed home. I was speechless and inquired further for definite confirmation. I knew that if what she was telling me was true, little could be done to change the inevitable, based on the 1996 Telecommunications Act.

Not wanting to believe what I had just heard, with tears streaming down my face I raced over to the township office. Before reaching the door I struggled to contain my obvious state of distress. Inside I spoke with the zoning administrator, Ms. James. I shared with her what I had just been informed of. She had heard nothing about the agreement and proceeded to assure me that a tower would never be erected in that location even if such a contract did exist. Reason being, that the property was zoned for residential use and

was not in an area where a cell tower could be placed. I challenged her beliefs, stating that my research had led me to conclude otherwise and that her convictions simply weren't true. But, she like many others didn't accept that which I was telling her.

Being fully aware of how upset I was, she again confidentially assured me that no such union would ever take place in the designated location. As I walked out the door I knew she was wrong.

Upon returning home I conferred with Steve. Because of our understanding of the 1996 Telecommunications Act, we realized the perilous predicament we were in. We both knew that we had to act and act fast. There was no time to waste; we had no choice, but to move. We didn't want to move again; we had no where to go. We wanted to stay in our new house near family and friends; we wanted our children to remain in the same school with their friends. The timing wasn't right, four years earlier we had moved from across the nation, but because of Steve's sensitivity, we knew staying was not an option.

Just 6 months after finding a very remote safe haven for Steve, the girls and I returned to visit family and friends. I was eager to drive by our former house; it was truly no surprise to see a cell tower right where the postmaster said it would be, less than ¼ mile away. With a calm and curious demeanor, I paid another visit to the township zoning administrator. I asked Ms. James if she remembered me and our past conversation. She did. I asked her what had happened with the tower that now stands where she promised it never would. Defensively, she told me that the township and numerous people of the community fought the good fight, but when all was said and done, the battle was lost.

Ms. James confessed that she was surprised by the amount of authority that has been given to the industry to do whatever it is they want to do. Their disregard to the zoning laws and their immunity from having to comply with them came as a shock. Only by having extremely strong zoning laws established and local government authorities who are willing to do what it takes to go up against the multi-billion dollar industry can placement be diverted. These instances are rare. Outside of that, nothing can be done to stop the rapid expansion and development of the wireless networks that continue to grow in our residential neighborhoods and communities.

Cell Tower Placement

Because undeniable proof of increased vulnerability in children, the sick, the weak, and the elderly to RF/MW radiation exposure, some countries prohibit the placement of cell towers and antennas near schools, daycares, hospitals, and nursing homes. However, here in the U.S., these sites are often prime locations for tower placement.

Schools are an easy target for service providers, because they are always in such desperate need of revenue. School administrators are constantly seeking ways to make ends meet. They're willing to consider just about anything to get their needs met, including placing cell towers on top of the school or on school property. This usually provides a very lucrative stream of monthly income, which can continue for years, depending on the contractual agreement. Nevertheless, the seemingly worthwhile exchange of space for facility upgrades, books, playground equipment, computers, and the like has a bigger price tag than most would ever suspect.

Additionally, installing Wi-Fi systems into the schools or homes where children endure chronic, long term exposure is not a decision that should be taken lightly. These microwaves operate at higher frequencies than cell phones, potentially increasing the threat of harm. Children are much more vulnerable to their effects than adults because their bodies are smaller, much easier to infiltrate, and they absorb more radiation at a faster rate.

Numerous research efforts have indicated that children exposed to this type of wireless radiation are affected in a variety of ways; none of which are positive. There has been repeated evidence of significantly slowed reaction times, reduced memory capacity, learning impairments, concentration difficulties, altered brain waves which leads to behavior changes and mood swings, cognitive and motor skill dysfunction, and immune system irregularities.[235]

It is extremely worrisome that such a desirable technological device which offers numerous benefits can cause so many adverse health effects, especially in our youth.

---

[235] Chiang, H. Yao, G. D., Fang, Q. S., Wang K. Q., Lu, D. Z. and Zhou, Y. K., "Health Effects of Environmental Electromagnetic Fields," *J. Bioelectricity,* 1989, volume 8, pp. 127-131.

Firefighters Fight Back

Over the past several years, there has been growing concern among U.S. and Canadian firefighters, regarding the placement of cell towers on the rooftops of fire stations. As with schools, when it comes to positioning towers, wireless service providers target municipal buildings. Fire stations are also considered key locations, because of their centralized locations and the fact that the industry can avoid any unnecessary red tape. Local authorities receive tremendous compensation from such contractual arrangements, benefiting handsomely from each and every tower placed on all city, county, state, or government owned properties, including fire stations, schools, and the like.

In August of 2004, the issue was formerly addressed at the International Association of Fire Fighters (IAFF) Convention in Boston, MA. There, Lt. Ron Cronin of the Brookline, MA, Fire Department openly expressed concern. "Some firefighters with cell towers currently located on their stations are experiencing symptoms that put our first responders at risk. It is important to be sure we understand what effects these towers may have on the firefighters living in these stations. If the jakes in the fire houses are suffering from headaches, can't respond quickly and their ability to make decisions is clouded by a sort of brain fog, then entire communities they are protecting will clearly be at risk. No one wants the guys responding to their family emergency to be functioning at anything less than 100 percent capacity."

Cronin's statement was in response to a study of firefighters who had been residing in stations with rooftop tower antennas for up to five years. It was found that they suffered from similar neurological abnormalities as those who suffer from Microwave Sickness: slowed reaction time, lack of focus, lack of impulse control, severe headaches, anesthesia-like sleep, sleep deprivation, depression, and tremors. Individual brain scans also revealed mutual gross irregularities.[236]

---

[236] *International Association of Fire Fighters, AFL-CIO, CLC,* Division of Occupational Health, Safety, and Medicine. http://www.iaff.org/hs/resi/celltowerfinal.htm (March 2005). Concerns of cell tower placement on fire stations was brought forth at the International Association of Fire Fighters (IAFF) convention, Boston, MA August 2004.

Real People, Real Stories

In 1995 a retired couple bought a resort home east of Vancover, B.C. Both enjoyed good health until they claimed that their world came crashing down. What began with buzzing sounds in the distance, led to uncomfortable pressure in the head and ears. The symptoms were followed by severe headache, neck and shoulder pain, and continual nausea that increased with time. Relief was found only when the couple traveled 30 minutes away from their home. One year after moving into their dream home, the man became so ill that he and his wife had to leave. The incident destroyed their golden years, along with their marriage.

Through his personal research, the man discovered that he was being affected by the radiation of a nearby cell tower. He made the following statement, "I would advise anyone that lives near a tower and starts to feel the following symptoms to move fast before you become sensitive as I have. The symptoms started with a buzzing sound and developed into a high pitch sizzle sound in my head, pressure headaches, blocked ears, pain in neck, shoulder and other joints, nausea, stress, burning eyes, fuzzy vision, memory loss, imbalance and fatigue."

Another senior citizen describes moving into a 20th floor apartment of a government subsidized housing facility. "I immediately began experiencing symptoms of a dizzy, off balance feeling, headaches which were constant, severe insomnia, profuse nose bleeds, …I wasn't able to concentrate. I would often find myself…feeling "out of it", not remembering. I felt drained…I had anxiety attacks and breathlessness, felt agitated, restless and my joints and my eyes were sore. My chest felt pressure."

A magazine article disclosed to this apartment resident that microwaves from cell towers emit harmful radiation that impacts humans in much the same ways as he had been experiencing. He began to pay close attention to his surroundings and discovered that the rooftop of his complex, just one floor above where he resided, housed at least 25 telecommunication antennas and microwave towers. He proclaimed, "The top of the building looks like a porcupine!"[237]

[237] Riedlinger, Robert, "Electro-magnetic Emissions Enough to Make Some People Sick", *Citizens Initiative Omega*, Vol. 24, No. 06, 2003.

Sheila Rogers, editor of Latitudes, a quarterly publication of the Association for Comprehensive NeuroTherapy shared a despairing story of two dairy farmers and how a nearby cell tower affected their family. A 150 acre parcel of land and a farming business had been passed down through the generations to Meredith, her husband, and their four children. Soon after its acquisition, a neighbor had a cell tower erected on his property, 800 feet from the farmer's happy home. Although unsightly, they were assured that the tower was completely safe.

Over the next six months, the herd that grazed near the tower became discontented and easily agitated; their hides became tough. All four children developed unusual, raised skin rashes and experienced recurring kidney infections. The two younger children became dramatically hyperactive, while the older two complained of foggy thinking and concentration difficulties. Sleep disturbances affected the entire family and Meredith, in her early thirties, suffered from joint problems.

While searching for answers, the writer says, "They tracked down a researcher at the EPA. He told Meredith that as a government official he should reassure her that they (cell towers) were safe." He proceeded to follow that with a strict warning, "But with his 'citizen cap' on, he had to say that they should move immediately".

After selling the herd and moving to an area away from cell towers in Michigan's Upper Peninsula, everyone's symptoms subsided. Within one year they regained their strength and were ready to return to the farm. The family was reassured by the cell phone company that the tower was absolutely safe.

Following their return, problems began to resurface. The children lost weight and their hair was falling out. Meredith gave birth to a son born with birth defects the doctor couldn't explain. The neighbors were also experiencing unusual complications. Town residents were seeing an increased rate of suicide and abnormal seizure activity. Even the new herd of cattle exhibited abnormalities. Calves were being born with front legs shorter than the back ones, their hooves were deformed, they were no longer chewing their cud, and unusual tumors developed.

After moving away from the situation, the writer asked Meredith, "What happened to the farm? Meredith sighs, 'It just sits there. Empty. Selling the farm has not been considered. Should we let this happen to someone else?'"

Such stories, while seemingly rare, are not as uncommon as you may think. I have heard similar stories from numerous people. Purely coincidence? I highly doubt it.

Electro-sensitive people in this country are often scoffed at and challenged. Their circumstances make it difficult for them to function, let alone drive, hold a job, or maintain relationships. Even with assistance, it is a financial strain to fund all the prescription drugs that are supposed to offer relief. It's really a shame because ultimately these people can truly become imprisoned, socially, physically, and environmentally.

Different Cell Tower Variations

Most Common Cell Towers

The number and levels of antennas and panels give evidence that these sites are shared by multiple service providers.

Microwave Communication Panels on Buildings

In metropolitan areas where tower space is limited, service providers lease panel space on sides of buildings and rooftops.

Cell Cites, Antennas, and Satellite Dishes Top Buildings

Numerous buildings across the nation, especially municipal and hospital buildings, lease rooftop space to service providers.

Communication Panels Can Be Placed Anywhere

Water towers, smoke stacks, or any place that offers the height necessary to transmit signals serve as desirable locations for placement.

More Cell Towers

Flat, Semi-Rounded Panels and Single Antenna Lobes

These types of microwave transmitters and receivers offer numerous placement options, including atop telephone poles.

Rod-Shaped Masts

Such masts are easily disguised in a variety of ways. Some of the most common hiding places are inside flag poles, crosses, and other tall cylinder-like entities.

Cell Sites are Everywhere

With such versatility, microwave signals can be transmitted and received from just about anywhere.
There are few exceptions.

Natural Beauty or Cell Site?

Cell towers are becoming commonplace in our natural environment. You can see their communication panels hidden in cactuses, palm trees, and pine trees.

CHAPTER 11

The Consequential Impact on Our Youth

Children and teens are the fastest growing group of mobile phone users in the world. Coincidentally, they are also the most vulnerable to the hazards associated with its exposure. What's worse is that with full knowledge of what worldwide studies have shown regarding this incompatible union, the industry continues to heavily promote their phones to our the youth with explicit intent and with clear, direct messages. Over the past several years the industry has successfully been able to convince the younger generation that it is socially unacceptable not to have a cell phone.

Scientists, researchers, experts, and medical professionals from around the world who are familiar with RF/MW radiation and the adverse health effects linked to cell phone use, are strongly discouraging young people from using cell phones. There are 5 principal reasons why children are so much more susceptible to this type of intrusive external stimuli than adults:

1) Children have thinner skulls, making it easier for cell phone RF/MW radiation to penetrate;
2) the rapid division of cells in children dramatically increases their risk of DNA damage;
3) children have underdeveloped immune systems which are not equipped to protect them from this harmful carcinogen;[238]

[238] *Health Effects of Microwave Radiation (Western View),* http://www.goodhealthinfo.net/radiation/health_efx_western.htm (March 2007).

4) the young brains of children absorb close to 50% more radiation; and [239]
5) children's brains and eyes absorb microwaves at a rate of 3.3 times faster.

In 1996, Dr. Om Gandhi, a widely respected scientist from the University of Utah, released a warning regarding children and cell phone use. His study concluded that while pressing the operating device against the head, the amount of microwave radiation measured in milliwatts per kilogram (mW/kg) being absorbed into an adult brain is approximately 7.84; in a ten year old child the absorption rate escalates to 19.77; in a five year old child the level of absorbed radiation sky rockets to a frightening 33.12! Research has shown that doses of less than 5 mW/kg produce enough deep tissue heating to cause damage to the human brain.[240]

Along with these astonishing absorption rates, it was observed that younger children with the thinnest skulls have the most sensitive brain tissue; therefore they incur a greater degree of injury. Since the smallest of children are posed with the greatest threat, it goes without saying that infants are at maximum risk. This data establishes the fact that when it comes to absorption, not only is a child's delicate body significantly weaker than an adult's, but their underdeveloped immune system lacks the ability to fight against an assault of RF/MW energy, thus leaving them defenseless. In other words, due to this reality, children are much more prone to the development of genetic damage and other related adverse health effects.[241]

Altered Brain Waves, Altered Behavior

Dr. Michael Klieeisen of the Neuro Diagnostic Research Institute in Marbella, Spain, has ascertained from his research that after a child is exposed to the cell phone radiation from just one short call, he experiences a significant slowing and altering of brain

---

[239] C.H. Durney, *et al.,* "An Empirical Formula for Broad-Band SAR Calculations of Prolate Spheroidal Models of Humans and Animals," *IEEE Transactions on Microwave Theory and Techniques* MTT-27, No. 8 (August 1979): pp. 758-763.
[240] Robert Kane, *Cellular Telephone Russian Roulette* (New York, NY: Vantage Press, 2001), p. 45.
[241] George Carlo and Martin Schram, *Cell Phones: Invisible Hazards of the Wireless Age* (New York, NY: Carroll & Graf Publishers, 2001), pp. 215-217.

function.[242] Like Klieeisen, Dr. Gerard Hyland, a physicist at Warwick University, Coventry, England, examined brain wave changes in children following short mobile phone calls. Hyland's comment regarding his research is painstakingly insightful. "The results show that children's brains are affected for long periods even after very short-term use. Their brain wave patterns are abnormal and stay like that for a long period. This could affect their mood and ability to learn … Alteration in brain waves could lead to…lack of concentration, memory loss, inability to learn and aggressive behavior."

Based on the results of his findings, Hyland offers this admonition, "If I were a parent I would now be extremely wary about allowing my children to use a mobile even for a very short period. My advice would be to avoid mobiles."[243]

Teen Brain Damage

Dr. Lief Salford, a neurosurgeon at Lund University in Sweden, published author, and respected researcher of multiple RF/MW radiation studies, and his colleagues conducted studies on GSM (digital) cell phone radiation to establish its effects on teenagers. Salford tested rats between 12-26 weeks old because they are the same developmental age of human teenagers. The rodents were exposed to two hours of microwave radiation and fifty days later there was "highly significant evidence" of brain damage throughout the cranium.[244]

It was also discovered that neuronal damage increased in accordance with exposure; a definite indication of a clear dose-response relationship. Salford noted, "If this effect was to transfer to young mobile users, the effects could be terrifying. We can see

---

[242] Woollhams, C., "Are Mobiles a Health Hazard?", *Police Magazine,* December 2002.

[243] ACN Online, "Electrical Sensitivity: A Global Growing Concern. How Wireless Technology May Impact Child Development and Central Nervous System Functioning," Association for Comprehensive Neurotherapy.

[244] BBC News Health Contents: Medical Notes, February 5, 2003,
"Mobile Phones May Trigger Alzheimer's,"
http://news.bbc.co.uk/2/low/health/2728149.stm

reduced brain capacity, meaning those who might normally have got Alzheimer's dementia in old age could get in much earlier."[245]

As previously mentioned, an article recently published in one of the nation's top newspapers reported that our society is beginning to see a considerable influx of people under the age of forty being diagnosed with Alzheimer's disease. This fatal and destructive disease, which used to be restricted to those with an inherited genetic link and to the elderly, is now swiftly merging into younger populations and affecting those with no family history of the ailment. Although the article offered no rationale for the mounting menace, we can only presuppose that since RF/MW radiation exposure has repeatedly been shown to lead to the development of Alzheimer's and other neurodegenerative diseases, it is highly possible that the root cause could be attributed to the rapid acceleration of this environmental carcinogen.

Following his study, Dr. Salford appeared on the UK BCC radio program "You and Yours", which was broadcast on February 5, 2003. As a concerned scientist and father, Salford took full advantage of the opportunity he was given to educate his audience. Based on his research findings, Salford had become thoroughly convinced that brain damage from cell phone use is a "probability rather than a possibility", more likely than not to develop. He also stated publicly that he would not allow his children to use a mobile phone for any reason outside of an emergency. Salford also reported that he was no longer willing to use his mobile unless it was for something important.[246]

Global Warnings to Parents

One critical fact that cannot be overlooked when discussing this topic is that our youth are starting to use cell phones at a much younger age than first generation cell phone users. This long term exposure significantly elevates their risk of consequences. Not only are our children more likely to develop adverse health effects they are more likely to develop them at a much younger age.

---

[245] ACN Online, "Electrical Sensitivity: A Global Growing Concern. How Wireless Technology May Impact Child Development and Central Nervous System Functioning," Association for Comprehensive Neurotherapy.

[246] *"Mobile Phone Signals Kill Brain Cells",* http://www.powerwatch.org.uk/ (February 6, 2003).

With the realization of this truth, along with available research data, it is no wonder that experts and professional organizations from around the world are making an unwavering stand against children using cell phones. The following list identifies a number of associations, governments, and individuals who feel that there is an urgently pressing need to educate parents and warn the public about the grave dangers we put our youth in when we place a cell phone in their hands.

- The San Francisco Medical Society

  The San Francisco Medical Society has advised parents that even, "The use of 'kiddy mobile phones'…are terrible ideas at this point".[247]

- The German Academy of Pediatrics

  The German Academy of Pediatrics has issued a statement advising parents to restrict their children's cell phone use. They strongly discourage against the unnecessary, frequent and extended use of mobiles by children. In addition, the Academy called for stricter RF/MW exposure limits and advised that all mobile phone users keep their calls as "brief as possible". [248, 249]

- The Federal Authority for Radiation Protection in Germany

  Wolfram Koenig, head of the Federal Authority for Radiation Protection in Germany, stated in an interview that, "Parents should take their children away from that technology [mobile phones]." He also urged the industry not to target children in their advertising campaigns.[250]

---

[247] *San Francisco Medical Society,* http://www.sfms.org/sfm/sfm301h.htm (2007).
[248] German Academy of Pediatrics: Keep Kids Away From Mobiles," *Microwave News* Vol. 21, No. 4 (Jan/Feb 2001): p. 5.
[249] Maisch, , Don, "Mobile Phone Use: It's Time to Take Precautions," *ACNEM Journal,* Vol. 20, No. 1, (April 2001): p. 4.
[250] *Berliner Morgenpost*, July 31, 2001.

- German Medical Doctors of the Interdisciplinary Association for Environmental Medicine

  This assembly of twenty two concerned medical doctors called for a ban on mobile phone use by small children and restrictions for teens. The reason this "call to action" was so critical was because of the type of diseases they were observing in their patients at unusually accelerated rates. All of which have been shown to be a direct consequence of RF/MW radiation exposure from cell phones and their towers.[251]

- The British Medical Association's Board of Science & Education

  The British Medical Association's Board of Science & Education has issued a report advising cell phone users to limit their RF/MW radiation exposure, especially when it involves children and their use.[252]

- The British Parliament's Independent Expert Group on Mobile Phones / The Stewart Commission

  Professor Challis, chairman of the Mobile Telecommunications Health Research Team, has expressed deep concern regarding the extent to which the youth are exploiting the use of cell phones. He believes that more needs to be done to educate our children about limiting the time they spend on their phones.[253]

  This assembly, primarily made up of biomedical specialists, joins in supporting the belief that "the widespread use of mobile phones by children for non-essential calls should be discouraged." They also recommended, "That the mobile

---

[251] *The EMR Network*.
http://www.emrpolicy.org/regulation/international/docs/freiburger_appeal.pdf
Also see statements from other countries.

[252] "Mobile Phones and Health," *The British Medical Association's Board of Science & Education,* May 24, 2001.

[253] "The Government Wants Us to Say that These Masts are Completely Safe and Aren't Dangerous, But We Can't Say That," Interview by Andy Mosley, *Express & Echo,* January 24, 2003.

phone industry should refrain from promoting the use of mobile phones by children."[254]

- The British Government

  In order to make strides toward addressing the seriousness of children, cell phone use, and their related health hazards, the British Government has recommended that all cell phones carry a warning label advising buyers that the devices should not be used by children.[255]

- The French Government

  The French Government has issued a parental advisory to limit children's cell phone use. [256] French officials also gave two additional warnings: They strongly advised pregnant women to distance their cell phones from their bellies and teenagers were instructed to keep cell phones away from their developing sex organs.[257]

  The section on Reproductive Concerns in Chapter 8 addresses several reasons why the French Government may have issued such warnings.

- The Australian Senate Environment, Communications, Information Technology and the Arts References Committee [258]

- Dr. Lief Salford, Lund University Neurosurgeon, Professor, Author of Multiple RF/MW Studies, and Concerned Father

---

[254] The Independent Expert Group on Mobile Phones, *"Mobile Phones and Health",* Advice to Industry Vol. 1.No. 53 (April 2000), p. 8.

[255] Carlo, George and Martin Schram*, Cell Phones: Invisible Hazards of the Wireless Age* 2001, Carroll & Graf Publishers New York, NY p. XI

[256] *ACN Online*, "Electrical Sensitivity: A Global Growing Concern. How Wireless Technology May Impact Child Development and Central Nervous System Functioning," Association for Comprehensive Neurotherapy.

[257] "Eye on Europe," *Microwave News*, Vol. 22, No. 2 (March/April 2002) p.5.

[258] Inquiry into Electromagnetic Radiation June 2000. And "Kids Phone Usage Fears," *The Sunday Tasmanian,* March 18, 2001.

- Professor Albert Gjedde,
  Denmark Scientist and Brain Specialist

  Following a study on cell phones and cancer, Gjedde arrived at the conclusion that EMF exposure has the potential to lead to more serious brain damage in children than in adults. He suggested that Denmark reduce their mobile phone exposure to a minimum.[259]
- Olle Johansson,
  Associate Professor, Department of Neuroscience,
  Karolinska Institute in Sweden

  Olle Johansson, respected researcher, has been warning the public about the harmful effects of cell phone microwave irradiation on children since 1996.[260]

- Dr. Om Gandhi,
  One of the First Cell Phone Research Scientists,
  University of Utah, Salt Lake City

  Dr. Gandhi's 1996 study was the first to identify how cell phone radiation affects children to a much greater degree than adults, it could easily be presumed that this highly respected researcher's name be added to this list.

- Dr. Ross Adey,
  One of the World's Most Respected and
  Widely Published Senior Research Experts
  in the area of Health Effects and RF/MW Radiation

  Dr. Adey has spoken out to say that, "Children categorically should not be encouraged or allowed to use" cell phones.[261]

---

[259] Maish, Don, "Mobile Phone Use: It's Time to Take Precautions," *ACNEM Journal,* Vol. 20, No. 1 (April 2001): p. 4.
[260] *ACN Online*, "Electrical Sensitivity: A Global Growing Concern. How Wireless Technology May Impact Child Development and Central Nervous System Functioning," Association for Comprehensive Neurotherapy.
[261] Begich, Nick and Roderick, James, "Cell Phone Convenience or 21st Century Plague?," *Earthpulse Press, Inc.* http://www.earthpulse.com

- Dr. George Carlo,
  Epidemiologist and Wireless Safety Advocate

  "Children under the age of ten should not use wireless devices of any type."[262]

- Dr. Jerry Phillips,
  Research Biochemist

  Dr. Phillips assisted Dr. Adey with the Motorola-funded study which led to the uncovering of DNA damage to human blood cells resulting from mobile phone radiation exposure. After careful evaluation of these and other findings, Phillips made the comment, "I wouldn't let my child play in traffic. I'm not going to give my child a cell phone to put up against her head". [263]

- Dr. Gro Harlem Brundtland,
  General Director of WHO (The World Health Organization), former Prime Minister of Norway, and a Physician with a Degree in Public Health

  Dr. Brundtland discourages children from using mobile phones and likewise advises adults to limit their use and exposure.[264] Brundtland is electro-sensitive and personally suffers from headaches and warmth around the ear whenever she is on her phone. She's discovered what many others have, that contrary to what's believed, making shorter calls doesn't help alleviate the symptoms.[265]

---

[262] George Carlo and Martin Schram, *Cell Phones: Invisible Hazards of the Wireless Age* (New York, NY: Carroll & Graf Publishers, 2001), p. 250.
[263] Kelley, Libby, CWTI (Council on Wireless Technology Impacts), and EON International, DVD *"Public Exposure: DNA, Democracy and the Wireless Revolution",* 2000.
[264] *ACN Online*, "Electrical Sensitivity: A Global Growing Concern. How Wireless Technology May Impact Child Development and Central Nervous System Functioning," Association for Comprehensive Neurotherapy.
[265] "WHO Director on Cell Phones: Follow Precautionary Principle", *Microwave News,* Vol. 22, No. 2 (March/April 2002): p 6.

- Professor Michael Kundi,
  University of Vienna, Austria

- Physicians for a Healthy Environment in Austria[266]

  In order to educate parents and the general public, Austria's Physicians for a Healthy Environment produced an informational booklet to discourage the use of mobiles among children. Due to the consequences resulting from exposure to cell phone microwave radiation, allowing children to use the device is not only risky; it could lead to an early, preventable death.[267]

- Purachai Piemsomboon,
  The Government Minister of Thailand

  Purachai Piemsomboon has advised teenagers that if they continue to ignore the warning about limiting their cell phone use, a law to ban mobile phone use among teens might become necessary. This cautionary reprimand came after a Japanese study concluded that cell phone radiation causes brain cell and nerve damage, especially in young people.[268]

- The Environment Minister of Bangladesh

  The Environment Minister of Bangladesh has given serious consideration to incorporating a law that would ban the use of mobile phones for those 16 years of age and under. Family members have also been encouraged to keep their phones away from children. National policy is also being considered to restrict companies from selling mobiles to children.[269]

---

[266] *ACN Online*, "Electrical Sensitivity: A Global Growing Concern. How Wireless Technology May Impact Child Development and Central Nervous System Functioning," Association for Comprehensive Neurotherapy.
[267] "More Reasons Children May Be At Risk", *Microwave News,* Vol. 22, No. 4 (July/August 2002): p 13.
[268] "Thai Minister Mulls Cell Phone Ban for Youngsters," Channel News Asia: *Southeast Asia News* April 5, 2002.
[269] "Bangladesh to Ban Mobile Phones for Children," *Ananova-Orange Mobile News Service.* http://www.ananova.com (June 3, 2002).

- Dr. Gerard Hyland,
  Physicist at Warwick University, Coventry, England and the International Institute of Biophysics,
  Neuss-Holzheim, Germany

  Based on the disturbing evidence revealed in his extensive study of the research, Dr. Hyland had this to say, "If I were a parent I would now be extremely wary about allowing my children to use a mobile even for a very short period. My advice would be to avoid mobiles."[270]

- Gerry Haddad,
  CSIRO Telecommunications
  and Industrial Physics Chief

  Standing before the Australian Senate in 2000, Haddad warned that the proposed exposure limits did not take a high enough precautionary level of safety, especially for children. He recommended that the senate "Restrict use of mobile phones to children for essential purposes."[271]

Due to the abundance of information derived from the numerous worldwide efforts of well recognized and respected researchers in this area, it is undeniably obvious that children who use mobiles are posed with a much greater risk than adults. This extensive list of well respected scientists, governments, and other professionals, reflects acceptance of the current data and supports a proactive approach to keep children protected from a very serious health threat.

While these facts, which have repeatedly been confirmed, seem to give enough indication of danger for the French and British governments to take precautionary measures to inform and protect their nation's youth from harm, that's not what's happening here in the United States. The FDA and the FCC have stated that "the scientific evidence does not show a danger to users of wireless

---

[270] *ACN Online,* "Electrical Sensitivity: A Global Growing Concern. How Wireless Technology May Impact Child Development and Central Nervous System Functioning," Association for Comprehensive Neurotherapy.

[271] The Australian Senate Environment, Communications, Information Technology and the Arts Reference Committee: Inquiry into Electromagnetic Radiation, June 2000. Also: "Kids Phone Usage Fears," *The Sunday Tasmanian*, March 18, 2001.

communication devices, including children." However, they do acknowledge that "some groups sponsored by other national governments have advised that children be discouraged from using wireless phones at all".[272]

Regardless of how these precautionary advisories are viewed by U.S. government officials, these other regimens have made a stand based on their own objective research, not on what they are told by one of the wealthiest and fastest growing industries in the world.

If your children are begging you for a cell phone, talk to them about the risks associated with cell phone use. It will undoubtedly be a challenge to convince them that what you're saying is true, especially when their friends already possess the item in question. However, if even half of what you've learned from this book bubbles to the surface and is recognized as being accurate in the future, as it was with smoking, it will be worth the effort to put off the purchase as long as possible.

Another method of persuasion is to act as if you believe what you're saying. In other words, lead by example; your children want to be just like you (even though in their later years they aren't willing to admit it). When they're young and impressionable, downplay the importance of your phone; when they're older, demonstrate how to use the phone wisely. Helpful tips are provided in the next chapter.

If you're not a parent, but a grandparent, uncle, aunt, teacher, coach, or any other role model that children look up to, don't be afraid to share with them what you've learned from this book. Educate the youngsters who are important to you. They'll listen. It's the "word of mouth" networking that all of us need to get this critical message out to family members, friends, and others we care about. Through our combined effort we can all make a difference in the lives of our children.

[272] Quotes found on both the FDA.gov and the FCC.gov websites. Also located in the brochure entitled, "Consumer Information about Radio Frequency Emissions" which accompanies all new cell phones in the U.S..

CHAPTER 12

Playing it Smart

The purpose for writing this book was not to create a panic or to scare you into giving up your cell phone. Nor was it written to make you feel as though you are completely defenseless against this technological form of environmental pollution, also referred to as electrosmog. On the contrary, its intent is to educate and inform you; to tell you what nobody else is telling you, because I strongly believe that you have a right to know all that I've learned through my research and experience. Knowledge is power. With it we can make intelligent decisions; without it we can become extremely vulnerable and can fall victim to that of which we have no understanding.

For cell phone users, ignorance is not bliss. Ignorance has multiple detrimental effects some are even fatal. Once knowledge is acquired, you have to decide what you're going to do with it. You can accept it or reject it. Either way, I strongly advise you to take as many precautionary measures as possible to reduce unnecessary radiation exposure. And do whatever it takes to keep your children safe. Even if you don't believe all that's written in this book, you will have lost nothing by playing it smart.

Ways to Reduce Exposure

- Use a Corded, Land Line Phone Whenever Possible.

Phones with cords, although confining and archaic, do not emit harmful radiation or cause any adverse health effect. Therefore, they are a much safer and healthier choice. The FDA and the EPA

have both recommended the use of landline phones whenever possible.[273]

While cordless phones are more convenient than corded phones, cordless phones utilize the same RF/MW technology as cell phones to transmit their wireless signals, therefore both can adversely impact your health the same way.

- Limit Your Cell Phone Use.

Cell phones were initially created for emergency purposes only. However, years of industry promotion and the denial of dangers has made cell phones what they are today. Most operators don't give the slightest thought to making a call to talk about nothing.

Now knowing that consequences of long-term use do exist, you are in a better position to gauge the necessity of each call prior to making it or taking it. You are also better equipped to intentionally limit the number and length of your calls.

Dr. Roger Coghill, biologist and British mobile phone specialist has made this comment. "There is overwhelming evidence from 12 laboratories now that excessive use of a mobile phone, such as 20 minutes (a day), could be a serious health risk. Anyone who uses a mobile phone for longer quite literally needs their head examined."[274]

- Keep Calls as Short as Possible (preferably under 60 seconds).

Before making a call, identify the purpose for which you are calling. Doing this can help reduce the length of your outgoing calls, keeping them as short as possible, and eliminating unnecessary exposure. Since data indicates that most of the heating effect associated with absorption occurs within the first 60-90 seconds of exposure, it is best to limit calls to 60 seconds or less. Remember that the number of calls you make, *plus* the number of minutes you spend on your phone will determine the likelihood of developing both short and long-term health problems. There's very little

[273] Robert Kane, *Cellular Telephone Russian Roulette* (New York, NY: Vantage Press, 2001), p. 229.
[274] "Mobile Phones Linked to Cancer," *BBC News,* November 9, 1998.

difference between being on the phone for several short calls and being on the phone for a few long calls.

- Distance Your Cell Phone from Your Body.

The distance between your cell phone and your body determines the level of radiation exposure and absorption you will experience. Exposure is reduced the farther away your phone is from your body. Likewise, exposure increases the closer it is to your body. Simply put, there's really only one key word you need to remember in order to play it smart: *Distance*.

While everyone seems to have their cell phone attached to their belt or in their front pant's pocket while their phone is in "standby" mode, this is an unwise decision. Cell phones carried or worn near the waist in this manner operate at higher power levels than normal because the tissue and the organs in that particular region (the liver, the kidney, and the testes) absorb more radiation than other body parts. This increased absorption makes the phone work harder, receiving and emitting greater amounts of radiation, in order to maintain a strong signal.[275] Increased absorption intensifies heating, which destroys cells and causes damage.

Since the heart is so vulnerable and breast tissue is recognized as having an accelerated absorption rate when exposed to RF/MW energy, transporting cell phones against the chest is also highly unadvisable. The extent, to which business men are carrying their cell phones in their suit pocket, resting it against their chest, could be contributing to the growing incidents of breast cancer in men. Based on all of the information that has been disclosed in this publication, cell phone operators who tote their phones on their bodies in "standby" mode are asking for trouble. They are posed with consequences too great to minimize. Just on the lower portion of their body they can expect to experience an increased risk of liver and testicular cancer. Men exposed to this type of close range cell phone radiation are also likely to experience a reduction of testosterone, problematic erections, up to a 30% decrease in sperm count, and a significant reduction of sperm quality.[276, 277, 278, 279]

---

[275] "Cell Phone On Your Belt Brings Radiation to the Liver and Kidneys," *The Sunday Mirror,* July 10, 1999.

[276] Fejes, Imre, et al., *"Relationship Between Regular Cell Phone Use and Human Semen Quality,"* paper presented at the 20th Annual Meeting of the European Society of Human Reproduction and Embryology, Berlin, June 29, 2004.

Women electing to wear cell phones against their bodies are more likely to develop cervical and breast cancers, both of which have been attributed to RF/MW radiation exposure. [280] And although there's no supporting documentation of this adverse repercussion, I have been told by a number of women that soon after they began carrying their cell phone on their belt, they started having irregular menstrual cycles. Even though millions of people are wearing their cell phones against their body, can you think of one benefit that outweighs maintaining your good health?

- Avoid Holding the Phone Against Your Head.

Instead of having concentrated doses of microwaves radiating deep into your brain, where they are absorbed and cause damage, it's imperative to distance yourself from your phone and its harmful emissions. In Motorola's information pamphlet which accompanies each of their new phones, this advice is given. "Do not hold the unit such that the antenna is exposed to parts of the body when the unit is turned on." Who are they kidding? Unlike the retractable antennas on older models, which allowed you to pull the radiating device away from your head, manufacturers now incorporate the antenna, the most dangerous part of your phone, inside of the phone so it's even closer to your head. What's worse is that all service providers advertise and display pictures of people holding a cell phone tightly pressed against their head, while at the same time the phone's manufacturer is clearly advising you to do just the opposite!

Realizing that the manufacturer is advising operators not to expose an active phone (with an internal antenna) to the body while it's on provides yet another compelling argument against choosing to wear a cell phone against the body when it is in "standby" mode.

---

[277] Lai, Henry, *"Biological Effects of Radiofrequency Radiation",* Paper for the Scientific Workshop "EMF-Scientific and Legal Issues, Theory and Evidence of EMF Biological and Health Effects" in Catania, Sicily, Italy, September 13-14, 2002, organized by the Italian National Institute for Prevention and Work Safety.

[278] Wayne Rash, "Cell Phone Use Affects Fertility, Study Shows," *EWeek.com*, October 27, 2006.

[279] "Cell Phones Can Affect Sperm Quality, Researcher Says*," CNN News,* September 18, 2008.

[280] Cherry, Neil, *"Cell Phone Radiation Poses a Serious Biological and Health Risk,"* http://www.buergerwelle.de/pdf/cell_phone_radiation_poses_a_serious_biological_and_health_risk.pdf (May 7, 2001).

- Keep the Phone Away from Your Head While Connections are Being Made.

Holding the phone away from your head while a call is being made and the signals are connecting is another way of playing it smart. Prior to calls being joined together, the phone's power level is significantly increased in order to achieve complete transmission. To avoid this elevated degree of unnecessary exposure, instead of pressing the phone to your head listening to it ring and waiting for an answer, listen through the speakerphone or watch until your phone's screen indicates that the connection is complete. Any amount of distance created between your head and the phone is better than none.

- Use the Speakerphone Whenever Possible.

Opting to use the speakerphone feature whenever possible is another easy way to reduce emissions. The speakerphone enables you to comfortably converse while distancing the cell phone from your head.

- Opt for Text Messaging or E-Mailing.

Another means of reducing exposure by creating distance between your head and your phone is to text message or e-mail, rather than talk. If you've got a brief message to communicate, use one of these two methods. Texting and e-mailing both reduce exposure while eliminating unnecessary talk time. If your children own a cell phone, encourage them to use one of these methods to communicate more safely with friends and family.

- Alternate Head Sides When Talking on Wireless Phones.

If for some reason you choose to continue holding a cell phone directly against your head, alternate ears while conversing. Data extracted from several studies has shown that those who have used a cell phone for 10+ years are posed with a higher risk of developing brain tumors and acoustic neuromas. The risk of developing a brain tumor for those who alternate head sides while talking on a cell phone is 20%. Those who don't rotate sides, increase their brain tumor risk by 200%! Cell phone users of 3+

years have a 30-60% chance of developing acoustic neuroma.[281] That risk increases to 240% if the cell phone is primarily used on only one side of the head.[282] The same proves true for cordless phones. Get in the habit of switching sides, it's a simple safeguard.

- Avoid Using Wired Headsets.

Headsets which use metal wiring leading into the ear piece can increase exposure. Instead of reducing the amount of RF/MW radiation being absorbed into your head, this type of headset actually brings it much closer to your brain than if you had your handset pressed against your ear. The wire not only acts as part of the antenna, the most dangerous part of the phone, but according to the British Consumers Association these popular headsets have been found to deliver 3.5 times as much radiation as handsets. Wired headsets also have the capability of picking up other concentrated electromagnetic fields (EMFs) from nearby sources, thereby contributing even more intensified amounts of radiation into the user's head.[283]

- Avoid Using Wireless Ear Pieces.

Similarly, wireless ear pieces should be avoided. These innovative hands-free devices operate at the same frequency level as cell phones, utilizing identical RF/MW technology. However, they are much more dangerous because instead of limiting your exposure to when you're actually using your phone, these contraptions hang on your ear in "standby" mode, constantly receiving and transmitting signals to and from nearby cell sites. This same chronic exposure is why it's best to avoid wearing your cell phone on or against your body.

---

[281] George Carlo and Martin Schram, *Cell Phones: Invisible Hazards of the Wireless Age* (New York, NY: Carroll & Graf Publishers, 2001), p. 170.
[282] Sage, C., *The Bio Initiative Report,* http://www.bioinitiative.org/report/docs/section_1.pdf (May 2008), p. 9.
[283] "The Invisible Dangers of EMF Radiation", *BioPro International, Inc.,* http://www.biopro.com (March 22, 2005).

- Refrain from Using Your Cell Phone while Driving.

While most drivers believe that they can successfully drive and talk on their cell phone at the same time, research efforts prove otherwise. Frequently, cell phone users drive with just one hand on the steering wheel, they are easily distracted by their conversations, and their focus is not on the road. Evidence of neurological effects that hinder driving include a reduced awareness of surroundings, a decreased capacity for paying attention, slower reaction times along with an inability to make quick decisions and respond to them accordingly. As exemplified by a University of Utah study, these impairments are equivalent to those of a drunk driver. [284]

Other neurological abnormalities linked to exposure that could affect driving include increased levels of stress, anxiety, and irritability. On the road this could easily translate into the agitated behavior some refer to as "road rage".

Two studies, one conducted by the University of Toronto in Canada and the other by The Insurance Institute for Highway Safety in Perth, Australia, both resolved that cell phone users are 4 times as likely to get into a serious car accident than other drivers.[285] It has also been reported that cell phone operators who use their phone for 50+ minutes a day, while driving or not, are 5.6 times as likely to get into an automobile accident than those who are on their phone less often.[286] Not only do the number of accidents increase with heightened levels of exposure, but the degree of severity and fatality probability is also significantly elevated.[287]

Due to this noticeable hazard, many states have made it illegal to drive while holding a handset. To improve your driving ability as well as minimizing your accident risk, you can incorporate the use of a hands free speaker phone, place an external antenna on the outside of your vehicle, or employ the use of an air (not a wired or wireless) headset. All offer safer alternatives to holding a handset to your head while driving.

---

[284] Mitchell, C. L., *et al.*, "Some Behavioral Effects of Short-Term Exposure of Rats to 2.45 GHz Microwave radiation," *Bioelectromagnetics,* Vol. 9, No. 3 (1988): pp. 259-268

[285] Slesin, Louis, *Microwave News* March/April 1997. p. 8.

[286] Violanti, J.M. and Marshall, J.R., "Cellular Phones and Traffic Accidents: An Epidemiological Approach," *Accid Anal Prev* Vol. 28, No.2 (1996): pp. 265-270.

[287] Violanti, J.M., "Cellular Phones and Fatal Traffic Accidents," *Accid Anal Prev Vol.* 30, No. 4 (1998): pp. 519-524.

- Avoid Using Cell Phones Near Reflective Surfaces.

This may sound rather peculiar to you, but if at all possible avoid using cell phones near reflective surfaces. Studies have shown that your phone's electromagnetic waves, in close proximity to reflective surfaces, can significantly magnify RF/MW radiation exposure. The increased exposure resulting from this reflective effect is at an absorption rate of 4.7 times greater than if proximity to such reflective materials is avoided.[288] This is in addition to the 50-90% which is already being absorbed into the brain from your phone's energy. This concept is similar to that of using a sun reflector to intensify exposure while sunbathing. [289]

Also, if you use your phone while driving, be aware that inside your vehicle you are surrounded by numerous reflective, metal components. These intensify your level of exposure, maximizing the heating effect, as well as your rate of radiation absorption. Other places of excessive exposure include office buildings, elevators, subways, trains, airplanes, and the like, which are constructed primarily of metal. Unfortunately, your cell phone is not the only culprit; other people's cell phones, wireless networks, and nearby cell towers also play an active and considerable role in the amount of irradiation you receive from reflective surroundings.

Studies have also found evidence that cell phone users who wear metal-framed glasses significantly increase their eye exposure by 20% and their head exposure by 6.3%.[290] Since this seemingly insignificant reflective article magnifies and accelerates exposure, it would stand to reason that people with braces or those who wear reflective jewelry can also be imperiled to a heightened degree.

---

[288] O. P Gandhi, et al, "Deposition of Electromagnetic Energy in Animals and in Models of Man with and without Grounding and Reflector Effects, *Radio Science,* November/December 1977, pp. 39-47.

[289] Robert Kane, *Cellular Telephone Russian Roulette* (New York, NY: Vantage Press, 2001), pp. 59, 158.

[290] House of Commons, Great Britain. Third Report, The Science and Technology Committee. *"Scientific Advisory System: Mobile Phones and Health,"* September 22, 1999.

- Keep Cell Phones "OFF" When Not in Use.

Keeping your phone "off" (absent of signal) when it's not in use minimizes exposure. Rather than leaving it "on" in "standby" mode when you're not making or expecting a call, take advantage of voicemail. Forwarding calls to an available land line is also a beneficial option.

- Distance Yourself from Other Cell Phone Users.

As you know, distance is necessary in order to avoid unnecessary exposure. Not only is it advisable to maintain distance from your own cell phone, but it's recommended that you maintain your distance from other cell phones as well. Keep this in mind when someone next to you or behind you is using a cell phone in close proximity. The farther you are from the user, the safer you'll be.

- Avoid Using Cell Phones in Close Proximity to Small Children.

This is important enough to repeat. Children have an elevated risk of radiation absorption and potential damage from exposure, so it's critical to be aware of their propinquity while talking on your phone. If you notice that you're too close, simply step away. Remember, the smaller the child, the greater the risk.

- Avoid Using Cell Phones when Signal Strength is Weak.

Cell phone operation is least hazardous when signal strength is strong. When the phone has a powerful signal it doesn't have to work as hard and emits less energy. Therefore, prior to making or taking a call, determine your phone's signal strength. The closer you are to the nearest tower or base station the stronger your signal will be, and the farther away you are, the weaker the signal.

When you have a weak signal, your phone has to work harder and use more power to make a call. The harder your phone has to work to transmit or receive a signal, the more radiation is required. To avoid unnecessary exposure only use your phone when signal strength is strong.[291]

[291] Slesin, Louis, *Microwave News,* http://microwavenews.com/nc_apr2007.html (April 2007).

- Discourage Children & Teens from Using Cell Phones.

Share with your children what you have learned regarding cell phone dangers and encourage them to text message or e-mail friends, rather than calling them. When calls are made, promote speaker phone use. If a land line is available, encourage its use by designating the land line as the first and best option for talking with someone.

- Pregnant Women Should Avoid Cell Phone Use Entirely.

Pregnant women should avoid being unnecessarily exposed to all types of wireless signals, not just cell phone signals. Wearing a cell phone on the body while pregnant should be avoided at all costs, because exposure to this kind of radiation has been shown to result in miscarriage, birth defects, and all sorts of damage to the unborn child.

- Give your Brain a Break.

Give your brain a break after each phone call. Recovery time can vary from one mobile conversation to another. The length of the call should be indicative as to the amount of repair time necessary. Longer exposures constitute longer repair time and shorter exposures need less time. Without the ability to feel or see actual cell and tissue damage, it's difficult to know how much time is enough.

Bear in mind that the effects of RF/MW radiation are cumulative; repeated damage from several shorts calls or a few long calls without adequate recovery time can result in permanent, long-term consequences.

- Take Other Precautionary Measures.

If you choose to use a cell phone as your primary means of telecommunication or for extensive use, protect yourself from unnecessary exposure and potential harm as much as possible. These safety tips are meant to assist you in keeping safe and playing it smart. Employ as many of them as possible and educate others to do the same.

CONCLUSION

What Now?

If history has taught us anything it is that when new consumer products, offering enormous benefits and having mass appeal emerge into the marketplace, they are eagerly embraced and employed with great enthusiasm and little concern. This is especially true of wireless technology.

While most consumer products introduced for use are FDA-approved and pose no threat of harm, others have later been found to be extremely toxic and carcinogenic. Consider the examples of DDT, lead-based paint, asbestos, and cigarettes. When these items first became available to consumers, sales and use soared without restraint. After decades of exposure to these particular substances people began to get sick and die. These incidents commenced long before the government and the industries manufacturing and selling these products were willing to accept the scientific evidence proving danger as being conclusive and irrefutable. Only then were changes made.

Industry concealment is not an unusual business tactic when the truth threatens to impact the bottom line. "The U.S. government and the asbestos industry have been criticized for not acting quickly enough to inform the public of dangers, and to reduce public exposure. In the late 1970s, court documents proved that asbestos industry officials knew of asbestos dangers and tried to conceal them."[292] An effective concealment of truth was also systematically uncovered when the tobacco industry was finally exposed.

Today we are facing yet another trade organization that is exposing consumers to life-threatening health hazards, yet like the

[292] *Wikipedia, The Free Encyclopedia,* http://www.en.wikipedia.org/wiki/Asbestos

others, they are unwilling to inform the public of suspected and recognized dangers. Even though intelligence documents prove that western governments have known that cell phone radiation causes brain damage for more than 30 years, they have hidden the facts proving it![293] Chapter 2 fully exposes other successful industry cover ups.

What we have learned from these lessons is that big business is politically supported and that the denial of facts and research data can be conveniently hidden in order to insure self-preservation. It isn't until the problems become so great and the issue can no longer be contained, that the truth is finally made public. Until then, we remain vulnerable and industries such as these continue to defend their position of safety using the key phrases that were effectively employed by the tobacco industry for decades. "There is not enough evidence proving harm. The studies are inconclusive. More research needs to be done." The question is how long are you willing to wait? How much are you willing to risk?

I hope you found this book to be informative. If you haven't noticed by now, like the cell phone industry, I've developed a belief system of my own. And even while the cellular industry would deem that the evidence remains inconclusive, there are more studies proving adverse health effects than studies proving safety. There is far too much data and supporting documentation from reliable, credible sources to deny that this energy does have a consequential impact on the human body.

While you may be thinking to yourself, "I've been using a cell phone for years and nothing bad is happening to me." Just know that the effects of RF/MW radiation exposure are rarely immediate, they are cumulative. It's not uncommon for toxic reactions to subtly creep in and lay dormant long before a problem is realized. As with all carcinogens, there are comparable manifestations of the irritant, yet every person's body is different with varying tolerance levels. Factors which determine individual reactions include age, health condition, genetic make-up, skull thickness, head shape and size, internal brain structure, hydration and density of tissue. Source of exposure, frequency, waveform, duration of exposure, number of

[293] Moran, Kathy, "Soviet Proof That Mobile Phones Do Cause Brain Damage," *Daily Express*, November 10,1999.

exposures, and pulse modulation of the signal also contribute to establishing individual response. [294]

And although it may be no big deal that you forgot to pick your daughter up from piano practice, missed an important meeting, or can't remember the name of an old college friend, a neurological disorder could be developing. Memory loss is not normal neither are headaches, concentration difficulties, sleeping problems, dizziness, mood swings, irritability, anxiety or fatigue. If these abnormalities persist and are ignored or masked with drugs, they can become irreversible and permanent disorders which can lead to life-threatening diseases.

As you go forth in your search for answers, every time new information becomes available give the most consideration to studies that are conducted by independent, non-interested, third-party researchers and organizations. These offer an elevated degree of credibility, because objective views can't be bought.

One thing is for certain, change is needed in order to ensure safety. We can no longer remain quiet. We must speak out. In the United States, hundreds of cell towers, along with multitudes of other wireless networks, such as Wi-Fi and WI-MAX, are being erected daily. As the desire for newer technology increases, the industry eagerly accommodates by accelerating its expansion. These networks create an environmental hazard and we are all inadvertently and involuntarily being exposed to higher and more dangerous levels of RF/MW radiation. There appears to be no end to this escalation in sight, but the adoption of a more reasonable safety standard is a realistic measure that can be taken in order to help protect society and preserve quality of life.

Even if only half of what's written in this book is true, shouldn't it motivate you to take a proactive approach to your cell phone use? Continuing to use your wireless wonder freely and without restraint, assuming it's safe and throwing all caution to the wind, is downright foolish. Don't wait until it's too late. Ignoring the facts doesn't change them.

---

[294] Sage, C., *The Bio Initiative Report,* http://www.bioinitiative.org/report/docs/section_1.pdf (May 2008), p. 14.

Glossary of Terms

Athermal
Non-thermal. Any effect from electromagnetic energy which is not heat induced.

Base Station
An antenna structure which relays wireless RF/MW radiation signals between phones and other wireless devices to make and maintain connections.

Blood Brain Barrier (BBB)
A protective membrane and filtering system lining the exterior of the brain. Its function is to restrict the entrance of harmful toxins from entering the bloodstream and reaching the brain.

Carcinogen
Any substance that produces cancer.

CRADA (Cray-da)
Cooperative Research and Development Agreement. An agreement between the federal government and the industry to collectively do research.

CTIA
Cellular Telecommunications Internet Association. Formerly known as the Cellular Telecommunications Industry Association. The trade organization that represents wireless service providers.

Electrosensitivity, Electromagnetic Hypersensitivity
Unusual and often painful responses leading to adverse health effects from exposure to electric, magnetic or electromagnetic fields (EMFs).

Electromagnetic Field (EMF)
The generic term for the radiation that emanates from devices that operate using electric currents or radio waves.

Electromagnetic Radiation (EMR)
Oscillating electric and magnetic fields which can be classified as either ionizing or non-ionizing, based on whether it is capable of electrically charging atoms and breaking chemical bonds.

Electromagnetic Spectrum
Encompasses the range of all electromagnetic radiation from below the frequencies used for radio (long waves), to microwaves, infrared, visible, ultraviolet, x-ray, through to gamma radiation (short waves).

ELF
Extra low or extremely low frequency.

EPA
U.S. Environmental Protection Agency.

Epidemiology
Studies of diseases conducted on human groups and populations.

FCC
U.S. Federal Communications Commission. The branch of government which oversees all communication development and technology. It also sets acceptable criteria and parameters.

FDA
Food and Drug Administration. This U.S. branch of government is responsible for protecting citizens from all products that will be used by consumers.

Frequency
The number of oscillations or cycles per unit of time; cycles completed by electromagnetic waves in 1 second are usually expressed in hertz (Hz). Wireless communication signals operate at different frequencies.

GSM
Global System for Mobile communication. A digital, wireless network.

Hertz (Hz)
The speed in which radio waves travel. One hertz equates to one cycle per second.

Ionizing Radiation
Short electromagnetic waves which contain sufficient speed and energy to electrically charge ions and break chemical bonds (disconnecting electrons from atoms).

Megahertz (MHz)
A million cycles per second, radio wave speed.

Micronuclei
An abnormality of DNA fragments indicating genetic damage.

Microwaves
Non-ionizing mini short waves which are part of the electromagnetic spectrum. Microwaves are used to transmit and receive wireless signals.

Non-Ionizing Radiation
Short electromagnetic waves that do not contain sufficient speed or energy to electrically charge ions and break chemical bonds. Typically, non-ionizing radiation does not produce external heating, but it can elicit an undetectable heating response deep within biological tissue.

Power Density
The amount of power which is emitted from an electromagnetic wave at any given point. Measured in watts per square meter. A signal's power density weakens as distance from the source increases.

Radiofrequency (RF)
Rate of oscillation in electrical circuits or electromagnetic radiation within the range of 3 Hz to 300 GHz.

Radiofrequency Microwave (RF/MW) Radiation
The non-ionizing energy used to transmit and receive wireless signals.

Specific Absorption Rate (SAR)
How standards are established. The calculation used to determine how much RF energy is absorbed into 1 cubic gram of human tissue over a specified period of time. It is measured in watts per kilogram (W/kg). In the U.S., the allowable SAR from cell phones is 1.6 W/kg. Whole body exposure is not to exceed 0.8 W/kg averaged over 30 minutes.

WHO
World Health Organization.

Wi-Fi
Wireless Fidelity. A trademark of the Wi-Fi Alliance which certifies residential and commercial networks, mobile phones, video games, and other devices that require wireless networking. The term Wi-Fi is commonly used to depict *all* wireless Internet (WLAN) connections, regardless of whether or not they are actually Wi-Fi certified. Signals can transmit as far as 6 miles.

WiMAX Wireless Networks
Similar to WiFi networks, but these signals operate at higher speeds and can cover radial distances of up to 30 miles.[295]

Wireless Technology Research, L.L.C. (WTR)
A legal entity established by the CTIA to oversee industry-funded research efforts examining health impacts on the human body from wireless RF/MW radiation.

W/kg
Watts per kilogram. A unit of measurement used to determine SAR.

WLAN
Wireless Local Area Network used to establish Internet connections.

Definitions were extracted from a combination of Wikopedia.com, Carlo, George and Martin Schram*, Cell Phones: Invisible Hazards of the Wireless Age* (New York, NY: Carroll & Graf Publishers, 2001), pp. 262-265, and the glossary of terms from Sage, C., *The Bio Initiative Report,*
http://www.bioinitiative.org/report/docs/section_1.pdf (May 2008).

[295] Brain, Marshall, and Ed Grabianowski. "How WiMAX Works." 02 December 2004. HowStuffWorks.com. http://computer.howstuffworks.com/wimax.htm 16 February 2009.

Thank you for investing in this book. I hope you found it to be eye-opening and thought-provoking. Knowledge empowers us with the ability to make wise decisions. Proverbs 2:11 promises that discretion will protect you and understanding will guard you.

Is someone you love always on their cell phone? Isn't it time they realized the consequences of their excessive exposure, before it's too late? This book makes a great gift idea, one that shows how much you care. Buy it online today at **www.RealCellPhoneDangers.com** both paperback and e-book versions are available. You are also invited to submit your feedback and comments, shop our store of RF-reducing products, and get updated information on research about cell phone dangers and other wireless issues as they emerge.

If you consider this information valuable, please share what you've learned with your family and friends. Email them a link to **www.RealCellPhoneDangers.com** so that they can also become empowered with knowledge to make wise decisions regarding their exposure and that of their family. They will genuinely appreciate it.

Wholesale pricing, affiliate opportunities, and drop-shipping are available. Submit all inquiries to Premier Advantage Publishing.

- the web site:
  www.PremierAdvantagePublishing.com
  or **www.RealCellPhoneDangers.com**

- email:
  contactus@premieradvantagepublishing.com

- direct mail:
  Premier Advantage Publishing
  3819 Rivertown Pkwy, Ste. 300-#210
  Grandville, MI 49418 USA

- phone:
  248.747-8234

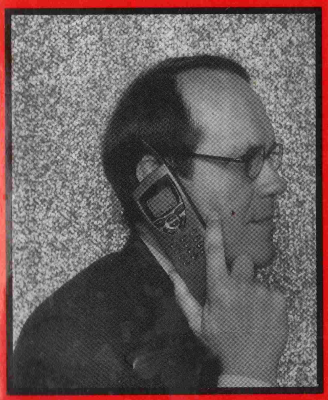
Carleigh Cooper's mission is to educate cell phone users on the real dangers which are proven to exist as a direct result of wireless RF/MW radiation exposure. Carleigh is available for book signings, speaking engagements, personal interviews, and other public relations events. For more information, please contact Premier Advantage Publishing, using one of the above methods.

"You pick up the phone once, twice, ten times a day — or only a few times a month. But, each and every time, you're gambling that 'this time' won't be the occasion when the radiation causes irreparable damage to your brain. It only takes a seemingly small trauma at a very small location to result in tissue damage, DNA damage, or chromosome mutations."

CELLULAR TELEPHONE RUSSIAN ROULETTE

A HISTORICAL AND SCIENTIFIC PERSPECTIVE

ROBERT C. KANE



Excerpts from the book:

"[A] repeated insult or irritation to a particular biological area, such as a small region of the brain, can lead to irreparable damage. [G]iven the existence of energy absorption "hot spots" . . . each damaging exposure to radiofrequency radiation provides a new opportunity that the damage will become permanent."

"[W]e can expect that no warning of brain tissue destruction would be provided to a cellular telephone user until the damage was so extensive that the scalp, which absorbs very little energy, sensed heating."

"Every action which occurs within that individual's life during that next week will be affected by the EEG modifications resulting from the portable cellular telephone call."

"[E]arlier, researchers have consistently reported that transmitting antennas could not be operated close to the human body—the human head-without violating the safe exposure limits."

"[T]he shape of the skull, thickness of sub-cutaneous fat, muscle layering, and how an individual holds a portable cellular telephone each contributes to make the energy absorption different from one individual to another. The important common factor, however, is that all individuals will absorb a large portion of the radiation."

"Today we know that even a single exposure to low level radiofrequency radiation causes damage to the DNA makeup of brain cells."

Cellular Telephone Russian Roulette

A Historical and Scientific Perspective

Robert C. Kane

VANTAGE PRESS
New York

FIRST EDITION

All rights reserved, including the right of
reproduction in whole or in part in any form.

Copyright © 2001 by Robert C. Kane

Published by Vantage Press, Inc.
516 West 34th Street, New York, New York 10001

Manufactured in the United States of America `
ISBN: 0-533-13673-3

Library of Congress Catalog Card No.: 00-91593

0 9 8 7 6 5 4 3 2

Contents

About the Author vii
Introduction ix

1. The Foundations of Radiation Research 1
2. "Hot Spot" Radiation Absorption 41
3. Biological Effects of Radiofrequency Energy 72
4. The Safety Standard Smoke Screen 117
5. Research Labs: The Good, The Bad, and the Biased 154
6. "Damage Control" I—the Birth of Public A Deception 190
7. "Damage Control" II—A Continuing Public Deception 206

About the Author

Robert C. Kane has been actively employed in the telecommunications industry for more than thirty years . He holds a BSEE from the Midwest College of Engineering, an MSEE with an emphasis in electromagnetics from the Illinois Institute of Technology and also at the Illinois Institute of Technology, has completed the full course of study and research leading to the Ph.D. in electrical engineering with emphasis in the fields of electromagnetics and solid-state physics. As a research scientist and product design engineer, he has been directly involved with programs and projects for the design and development of portable cell phones, radio frequency mobile radios, microwave telecommunications systems, video display systems, and biological effects research.

Introduction

The EMF and radiofrequency radiation issues are receiving a great deal of attention as of late. Whenever that, attention focuses on radiation from hand-held portable transmitters it invariably includes recent research findings that support the position that there may be an increased risk of disease caused by operating these devices.

Most notably, the currently available books, and articles on the RF radiation issue give only slight consideration, if any at all, to the large body of research studies that establish the scientific foundation on which the current findings are based.

Typically, the most recent research study will be reported as a revelation to be investigated further while industry continues to treat each such study as if it were isolated in the scientific universe. By keeping the findings uncollected and the data dissembled the financially interested parties can continue business as usual. Business and usual amounts to utilizing their substantial resources to employ the various media to broadcast the industry "belief system." The "belief system" renounces or buries unfavorable scientific findings.

This monograph takes a bold step backward by providing a broad view of the scientific landscape that clearly advises us that there is danger here. The bold step back ward is a historical accounting of the research that is available, has been available for forty years or more, and

has been neglected or buried by an industry that will place its absolute need to sell products above the health and well-being of its own customers. The practice of producing such products can only be viewed as predatory.

Never in human history has there been such a practice as we now encounter with the marketing and distributing of products hostile to the human biological system by an industry with foreknowledge of those effects. Unlike the tobacco industry, which could claim ignorance for many decades after its product came into common use, the telecommunications industry has had access to this same scientific research base to which you will now be introduced.

In this work you will not find details of the most recent research findings of cancer causation or DNA damage. Those studies, each in its turn, have been well publicized and quickly forgotten as the industry "spin doctors" discounted the importance of each finding. Instead what you will find here is a commentary that presents a litany of past research studies, hundreds of research studies from the 1950s through the mid-1990s. But don’t be misled. These older studies are equally alarming in their findings of radiation exposure, DNA damage, chromosome damage, tissue damage, radiation absorption, cataract formation, tumor formation, memory loss, motor skills degradation, and more. There are many more studies, hundreds that might have been added, but the point is well made by those that are cited without the need to bludgeon the reader with more than what has been presented.

Cellular Telephone Russian Roulette

1

The Foundations of Radiation Research

1

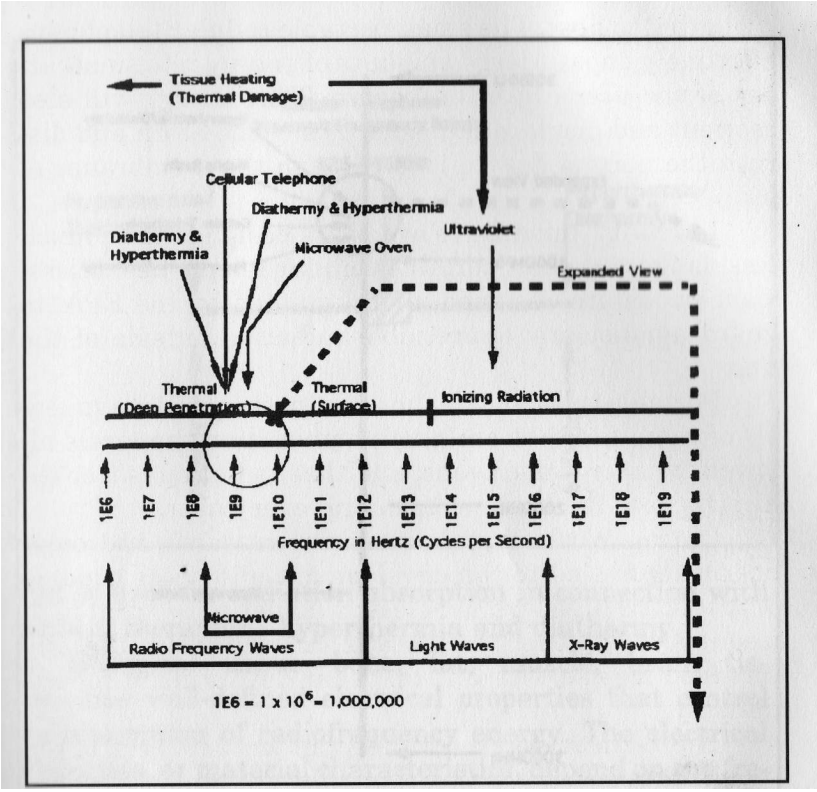
The earth and all living creatures on the land have evolved in an environment that has a low background level of radiofrequency radiation that occurs naturally.
The power density that radiates, close to the head of a user, from a portable 'cellular telephone is 2 billion times higher than that background level. More explicitly, a portable cellular telephone, held in the operating position, will provide a power density of radiofrequency radiation about 2 billion times greater than occurs naturally in the environment.

Since the portables are designed to be operated by being placed against the side of the user's head, a large part of the transmitter energy is radiated directly into that person's brain.

For communication purposes that absorbed energy is useless. But even more significant is that the absorbed energy acts within the brain to provide dangerous and damaging biological effects. One way to look at the portable cellular telephone is to visualize placing a miniature microwave oven directly against your head. The radiofrequency energy is absorbed into the head and brain and

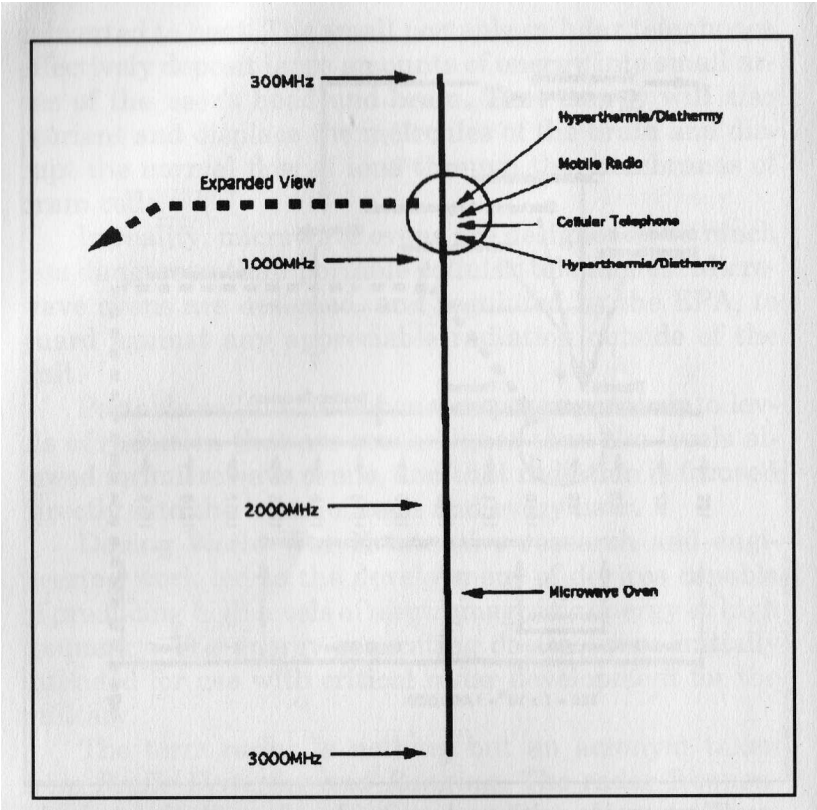
converted to heat. The small portable cellular telephones effectively deposit large amounts of energy into small areas of the user's head and brain. That energy will also reorient and displace the molecules of the brain and disrupt, the normal flow of ions through the membranes of brain cells.
In reality, microwave ovens are designed to be much less dangerous than portable cellular telephones. Microwave ovens are designed, and regulated by the EPA, to guard against any appreciable radiation outside of the unit.
Portable cellular telephones expose operators to levels of radiation that are much higher than the levels allowed for microwave ovens, and that radiation is focused directly into the brain of each and every user.
During World War II intensive research and engineering work led to the development of devices capable of producing high levels of electromagnetic energy at high frequency. The energy-generating devices were initially intended for use with critical radar development for the military.

The term radar is nothing but an acronym taken from Radio Detecting and Ranging. The radar frequencies are radio-frequencies. Some radar equipment operates in the same frequency range as does the cellular telephone, 800-900 MHz. Other radar systems operate at higher frequencies, around 2,000 MHz. In the early years of microwave ovens, they were commonly referred to as "radar ranges." There's nothing unique about radar; it's just another term for radiofrequency radiation. Along with the military applications of high-frequency energy generation for radar, research was initiated to investigate the prospects of utilizing the new energy source for medical applications.



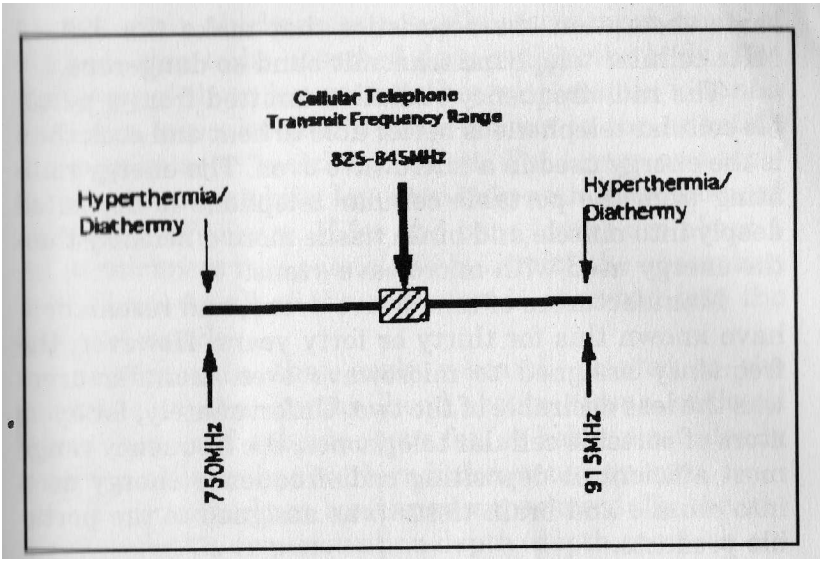
That work, although considered crude by today's standards and level of understanding, established a beginning point for research of the biological effects of radiofrequency (RF) and microwave radiation. The most significant facts learned in those early programs were that RF and microwave energy can be readily absorbed within the human body and that excessive energy absorption leads to tissue damage and death.

Considerable research has identified the radiofrequency (RF) energy that produces the most effective therapeutic results and, also, undesirable effects in people.



The frequencies from about 700 MHz to 1,000 MHz interact most efficiently with human tissue to yield the greatest energy absorption.

Notice that the frequency range of our interest, 750-950 MHz, occupies an infinitesimally small-portion of the electromagnetic spectrum. An even smaller portion of the spectrum is occupied by the portable cellular telephone transmit band, 825-45 MHz. It's a tiny sliver of the frequency spectrum in the very middle of the band



that is used for radiation absorption in connection with medical therapies—hyperthermia and diathermy.

Biological tissue — bone, fat, muscle, brain tissue - has well-defined electrical properties that control the absorption of radiofrequency energy. The electrical properties, or material characteristics, depend on the frequency of the electromagnetic energy. The properties at very low frequencies are much different from those at extremely high frequencies.

However, these material characteristics are virtually identical across the frequency range from 750 MHz to 950 MHz. That is, over the frequency range of 750 - 950 MHz the electrical properties of biological tissue do not change very much.

These energy absorption characteristics that make the 750 and 915 MHz frequencies so desirable for hyperthermia and diathermy treatments are also the very

same absorption characteristics that make the 825-45 MHz cellular telephone transmit band so dangerous. The radiofrequency radiation emitted from a portable cellular telephone is better able to heat and cook than is the energy used in a microwave oven. The energy radiating from the portable cellular telephone is deposited deeply into muscle and brain tissue more efficiently than the energy used with microwave ovens.

Manufacturers of microwave ovens, and researchers have known this for thirty or forty years. However, the frequency assigned to microwave oven manufacturers was the less desirable of the two. Unfortunately, for operators of portable cellular telephones, the frequency range most efficient at depositing radiofrequency energy deep into muscle and brain tissue was assigned to the portable products.

2

It has also been found that the electrical properties of various tissue layers may actually serve to increase the amount of radiofrequency energy absorbed within biological tissues such as muscle and brain.

Enormous variations in actually absorbed energy . . . depend on the thickness of the subcutaneous fat layer. [1]

The subcutaneous fat layer in humans lies beneath the skin and varies in thickness from one person to the

---

[1] *H. P. Schwan and G. M. Piersol, "The Absorption [of Electromagnetic Energy in Body Tissues," International Review of Physical Medicine and Rehabilitation, December 1954, pp. 371-404.*

next. Certain thicknesses actually cause much more of the radiation to be absorbed deep within the body. The thickness of these layers, together with certain antenna distances, can establish what is known in the scientific community as a "matching" effect. Fat layers and bone may serve as matching layers to help with this enhanced absorption of energy. If fat and bone layers are about 1 rm in thickness it is possible to maximize the absorption so that nearly all of the radiation is absorbed into the brain or muscle.

Significantly, that early research pointed to the structure of the human head, brain tissue enclosed within bone and subcutaneous fat, as being most ideally suited to efficiently absorb radiofrequency energy.

The researchers confirmed experimentally the absorption depth, or penetration depth (depth at which energy level has dropped to 37 percent of the surface value), for muscle and brain tissue. As energy penetrates into biological tissue some of it is absorbed and the remainder moves deeper, something like a cup of hot coffee spilled onto a stack of napkins. As you look more deeply into the stack, less of the coffee has penetrated, until finally you come to a point where all of the coffee has been absorbed into the napkins above. So, too, with absorption of radiofrequency energy; from the point of energy deposition the intensity will decrease as one observes farther into the body. However, under some conditions energy will be focused directly into deep regions of the human brain. At 825-45 MHz, the radiating frequency range for the portable, the penetration depth into brain tissue is from 2 cm to 3.8 cm.[2]

---

[2]*C. Polk and E. Postow, eds., CRC Handbook of Biological Effects of electromagnetic Fields, CRC Press, (Boca Raton, FL: 1986).*

Early experiments clearly show that the radiofrequency ·energy penetrates sufficiently deep within the biological tissue, such as a human brain, to provide a mechanism to effectively heat and in some cases overheat that tissue. According to the data of H. P. Schwan and G. M. Piersol, the radiofrequency radiation mostly passes through the surface layers of skin, fat, and bone and is absorbed within the underlying deeper tissue (brain tissue or muscle).

More recent work by N. Kuster[3] , O. Gandhi[4,5], G. Lovisolo[6], V. Hombachl[7], and others proves that a substantial amount of the radiofrequency radiation is deposited into the user's brain and converted to heat. These researchers have reported that from 50 percent to more than 90 percent of the radiofrequency energy is absorbed by the user instead of being transmitted into the atmosphere.

3

A unit of measure, called the Specific Absorption Rate (SAR)[8], given in terms of Watts per Kilogram (W/Kg) or

---

[3] N. Kuster, "Multiple Multipole Method for Simulating EM Problems Involving Biological Bodies," IEEE Transactions on Biomedical Engineering 40, no. 7 (July 1993), pp. 611-20.

[4] O. P. Gandhi, J. Y. Chen, and D. Wu, "Electromagnetic Absorption in the Human Head for Cellular Telephones," 16th Annual Bioelectromagnetics Society Conference, June 17, 1994, unpublished.

[5] O. P. Gandhi, "Electromagnetic Absorption in the Human Head and Neck for Cellular Telephones at 835MHz, revised," submitted to the U.S. Federal Communications Commission, August 1994.

[6] G. A. Lovisolo, "Hand-held Cellular Telephones: SAR Deposition in Phantoms," 16th Annual Bioelectromagnetics Society Conference, June 17, 1994.

[7] V. Hombach and H. Thielen, 16th Annual Bioelectromagnetics Society Conference, June 17, 1994.

[8] H. S. Ho and A. W. Guy, "Development of Dosimetry for RF and Microwave Radiation-II: Calculations of Absorbed Dose Distributions

milli—watts per gram (mW/g), provides more meaning and insight into experimental results. This measurement unit is particularly advantageous since absorption in biological bodies and specific organs is nonuniform and frequency-dependent. The SAR unit identifies the amount of power, in watts, that is absorbed in a gram of tissue.

A gram of tissue has a size of approximately a cube of one centimeter on a side or 0.4 inches on a side. Of course, a gram of tissue is not limited in shape, but for descriptive purposes it is instructive to visualize a cube.

Smaller volumes of tissue may also be considered when utilizing the SAR method, since it is a rate of depositing energy.

For example, if the energy absorbed in ten grams of tissue is measured the SAR is the average for each of the ten grams and if the energy deposited in 0.1 gram of tissue is used for the measurement the SAR is stated in terms of what the absorption would be if the rate were the same for ten of those 0.1 gram samples. The concept of SAR is a significant step forward, as it moves the discussion of safety or hazard to the place where the energy is absorbed - deep within the biological tissue. In the instance of portable cellular phones - within the brain.

Using the SAR (mW/g) lets the interested person, whether scientist, portable telephone user, or safety-conscious consumer, develop a clear visual picture of where the energy is deposited and how much is deposited. Use of the SAR, as a measure of absorbed energy, resulted in serious debate among researchers, since that meant the safety standards would need to be restated in terms of internal energy absorption in addition to power

---

in Two Sizes of Muscle-Equivalent Spheres," Health Physics, 29 (August 1975): 317-24.

density at the surface. That revision took place with the 1982 modifications to the IEEE/ANSI radiation exposure standard. But the portable cellular telephones were made exempt from any safety requirements—even for the SAR modification.

Experimental data show that energy absorption (SAR) within simulated brain material, at what would be the temporal lobe of the brain, is about 2.3 mW/g for a portable cellular telephone radiating 0.6 watts.[9] If it were not for the exemption that the industry promoted, the portables would be in violation of all accepted safety standards now in existence.

In another report of radiation penetration,[10] testing performed at 900 MHz and 0.6 watts output power provided averaged SAR levels of as much as 1.9 mW/g. This averaging, performed over ten grams of tissue, indicates that the peak energy absorption at local "hot spots" within that ten-gram volume was much higher than 1.9 mW/g. The researchers estimate that 72 percent of the radiated energy was absorbed by and "burnt off in the brain." Their choice of the phrase "burnt off in the brain" is very appropriate, as that is exactly what occurs. The radiofrequency energy is converted to heat, and the resulting heat, when sufficient, cooks the brain cells. But what is the significance of 2 mW/g, 3 mW/g, or 5 mW/g of absorption? Research results clearly show that such levels, measured in laboratory animals and models of humans, yield significant temperature rises

---

[9] *R. F. Cleveland and T. W. Athey, "Specific Absorption Rate (SAR) in Models of the Human Head Exposed to Hand-Held UHF Portable Radios," Bioelectromagnetics, 10, no. 2 (1989): pp. 173-86.*

[10] *G. A. Loxrisolo, et al., Hand-Held Cellular Telephones: SAR Deposition in Phantoms, 16th Annual Bioelectromagnetics Society Meeting, June 12-17, 1994, abstract book, p. 65.*

and all of the attendant biological effects mentioned earlier. For comparison, the IEEE/AN SI safe exposure limit is l.6 mW/g and even that level is facing strong opposition as being too high.

4

Computer analysis and measurements, which specifically considered the effects from portable antennas in close proximity to a human head, also show that about 50 percent of the radiated energy is absorbed in the head of the operator.[11] Graphic illustrations of the energy absorption profile clearly show very high absorption levels at the region of the head closest to the antenna.

The electromagnetic field exposure of a portable cellular telephone user depends on the type of antenna and its position.[12] There is a wide variety of antennas available, and each provides its own unique pattern of radiation into the head and brain. Some antennas are so efficient at directing radiation into the head and brain that they are used for diathermy and hyperthermia therapies. Depending on the type of antenna used, as much as 90 percent of the radiated energy can be absorbed within the head and brain of the user. These researchers also have reconfirmed that operation of commercially available portable cellular telephones provides for 50 percent or more of the radiated

---

[11] *H J. Toftgard, et al., "Effects on Portable Antennas of the Presence of a Person," IEEE Transactions on Antennas and Propagation 41, no. 6 (June 1993): 739-46.*

[12] *V. Hombach, and H. Thielen, Investigations on Antennas for Hand-Held Telephones with Minimum EM -Field Exposure of the User, 16th Annual Bioelectromagnetics Society Meeting, June 12-17, 1994, abstract book, p. 12.*

energy to be absorbed in the head of the user. They obtained the results with a simple homogeneous laboratory model. The simple, single material models understate the actual absorption that would occur in a human. Even so, their SAR levels indicate exposure at more than 5 mW/g for some antennas. Had they used a more complex, multilayered model the results would have indicated significantly higher radiation absorption by the user.

That energy absorption and conversion can, and does, lead to a dangerous temperature increase.[13,14] It's a thermal issue in addition to a nonthermal issue. Some researchers now believe that nonthermal effects may be dramatically multiplied in the presence of significant tissue heating.

Most of the temperature rise associated with the energy absorption takes place in the first sixty to ninety seconds of exposure. This finding is inconsistent with the cellular telephone industry's recommendation which suggests that if users are concerned about the effects of radiation they should make short calls to reduce the hazards of operation. From what the research data indicates, the definition of a short call would need to be much less than one minute—probably less than thirty seconds. In other words, based on these research findings and the industry's warnings portable cellular telephones should not be used.

Absorption of RF energy, with the use of selective shielding, revealed that the most sensitive area for absorption is over the temporal lobe of the brain and at

---

[13] *H. P. Schwan and G. M. Piersol, "The Absorption of Electromagnetic Energy in Body Tissues," International Review of Physical Medicine and Rehabilitation, June 1955, pp. 424-48.*

[14] *S. F. Cleary, "Uncertainties in the Evaluation of the Biological Effects of Microwave and Radiofrequency Radiation," Health Physics 25 (October 1973): pp. 387-404.*

frequencies from 300 to 1200 MHz.[15] This brings our attention to the issue of localized radiation absorptions and the possibility of damage to small areas in the head and brain.

> **"It should be understood that a cumulative effect is the accumulation of damage resulting from repeated exposures each of which is individually capable of producing some small degree of damage. In other words, a single exposure can result in covert thermal injury, but the incurred damage repairs itself within a sufficient time period, for example hours or days, and therefore is reversible and does not advance to a noticeable permanent, or semi-permanent state. If a second exposure or several repetitive exposures take place at time intervals shorter than that needed for repair, damage can advance to a noticeable stage."[16]**

What we learn is that a repeated insult or irritation to a particular biological area, such as a small region of the brain, can lead to irreparable damage. That is, given the existence of energy absorption "hot spots," the existence of which have been verified by numerous researchers, then each damaging exposure to radiofrequency radiation provides a new opportunity that the damage will become permanent. Part of the problem is that an exposed person would never know of the penetration and damage.

---

[15] I. J. Bahl, et al., "Microstrip Loop Radiators for Medical Applications," IEEE Transactions on Microwave Theory and Techniques MIT-30, no. 7 (July 1982) 1090-93.

[16] S. M. Michaelson, "Human Exposure to Nonionizing Radiant Energy—Potential Hazards and Safety Standard's," Proceedings of the IEEE, April 1972, pp. 389-421.

Perhaps even more troublesome is that tissue damage in the body is usually followed by a process of repair or restoration. So, each damaging exposure is likely to activate the growth of new cells to replace damaged or destroyed tissue. Cells that participate in the repair process are also likely to be some of the cells that were earlier damaged.

S. M. Michaelson reported that the thermal sensation of pain is evoked when thermal sensors in the skin reach approximately 46°C. From data given in that same research report we learn that no sensation of warmth would be felt in the skin, or scalp, until a dose of radiofrequency radiation was so high that internal damage to deep tissue was certain to result.

Researchers have pointed out that electromagnetic energy in the 900MHz region may be more harmful because of its greater penetrating capability compared to 2450 Mhz. [17,18] More of the energy in the 900 MHz frequency range is deposited deeply within biological tissue.

J. C. Lin concluded that 918 MHz energy constitutes a greater health hazard to the human brain than does 2450 MHz energy for a similar incident power density.

For these experiments he used a complex six-layered model of the human head that indicates peak SARs approximately 50 percent higher than simpler models and an average head absorption about five times higher than the single layered homogeneous models.

---

[17] *J. C. Lin, "Interaction of Two Cross-Polarized Electromagnetic Waves with Mammalian Cranial Structures," IEEE Transactions on Biomedical Engineering BME-23, no. 5 (September 197 6): 371-75.*

[18] *E. Friedenthal, et al., "Hyperthermia in the Treatment of Local Recurrence of Breast Cancer," Microwave Journal, May 1984, pp. 275-82. .*

Radiofrequency radiation and radiofrequency energy generated by cellular telephones are comprised of both electric and magnetic fields. Some researchers prefer to work only with the magnetic fields while ignoring the accompanying electric fields. An SAR relationship that is based exclusively on magnetic fields also indicates that the ANSI safety standards cannot be met for existing portable radio and telephone products. For an antenna placed at 1.5 cm from the surface of a flat layered model and radiating 0.6 watts, the experimental data indicate an energy absorption level of about 3.0 mW/g inside a human skull and a penetration depth of about 3 cm into the simulated brain tissue.[19]
The information simply reconfirms the body of research that has preceded. That is, energy absorbed into the head and brain of a user is dangerously high and in excess of the safety standards—if only the safety standards applied.

Twenty years ago industry researchers pitched the notion that the radiofrequency energy from portable transmitting devices was not absorbed into the head.
Now they admit that the energy is absorbed deep within the head. When these researchers established their original position it was based on the premise that there was a "peculiar nature" of the fields that stopped the energy at the surface of the human head. Apparently that `special physics` for portable transmitting radios and portable cellular telephones has become outdated.

---

[19] *N. Kuster and Q. Balzano, "Energy Absorption Mechanism by Biological Bodies in the Near Field of Dipole Antennas above 300 MHz," IEEE Transactions on Vehicular Technology 41, no. 1 (February 1992).·17—23.*

These industry researchers have provided even more convincing data from experiments with models simulatiung the human head as energy absorption levels of about 3.5 mW/g were reported.

Industry researchers, typically, have employed the most favorable models possible to yield the lowest level of energy absorption. Nevertheless, they arrive at absorption levels in the 3.0 mW/g range. Other researchers have shown that multilayer laboratory models provide energy absorption results that are 3 to 5 times higher than the simplified models. As such, we would expect that more accurate SARs would be in the range of 9-15 mW/g with a multilayered model.

To this point "hot spot" absorption mechanisms and nonuniform radiation emission in the near-zone have been ignored. If the numerous energy focusing and "hot spot" mechanisms are factored into the calculations the peak levels will be much higher; they would be on the order of 20-50 mW/ g at very localized areas of a human head and brain. It's not difficult to envision that the human brain is a collection of billions of molecules and interconnecting links, or bonds. Even one cubic centimeter of brain tissue includes billions of molecules and interconnecting bonds. Each of these molecules or bonds may be susceptible to extremely high energy absorption under certain conditions even while other molecules, only a short distance away, might be exposed to lower energy levels. Even as large variations in absorption levels are reported for macroscopic measurements we should expect even greater variations in absorption levels when looking at the microscopic or molecular level. Large temperature changes can be expected within biological tissue as a result of absorbing high levels of radiofrequency radiation.

Experiments show that a five—minute exposure to a surface power density of 100 mW/cm² at 710 MHz yields an internal temperature rise of 12°C.[20] If that exposure level were scaled back to what users of portable telephones experience, 10-20 mW/cm², the equivalent temperature rise within the tissue would be about 1.2—2.4°C, not counting any increased absorptions due to "hot spots." That is for only a five-minute exposure.

Tissue destruction is a sharp function of temperature, and a variation of only a fraction of a degree can mean the difference between acceptable and unacceptable damage to normal tissue.[21] We are reminded that low-frequency (less than 100 MHz) and very high-frequency radiation (more than about 3,000 MHz) is not well suited for deep absorption into biological tissue, the reason being that radiofrequency radiation of intermediate frequency, such as 918 MHz, is most efficiently absorbed into tissue. For his purposes, hyperthermia treatment of patients, L. S. Taylor advises that complex systems must be designed to prevent "hot spots." Although many "hot spots" and "hot spot" generating mechanisms have been related to cellular telephone transmitting antennas there are still no designs, or redesigns, to eliminate the "hot spot" radiation absorption.

In the following chapter the topic of "hot spots" will be considered in detail.

---

[20] *O. P. Gandhi, "Conditions of Strongest Electromagnetic Power Deposition in Man and Animals," IEEE Transactions on Microwave Theory and Techniques MTT-23, no. 12 (December 1975):1021-29.*

[21] *L. S. Taylor, "Implantable Radiators for Cancer Therapy by Microwave Hyperthermia," Proceedings of the IEEE 68, no. 1 (January 1980):142-149.*

6

In studies of diathermy applications it is consistently shown that electromagnetic energy at frequencies near and below 900 MHz is best suited for deep penetration into brain tissue. The depth of penetration is noticeable greater at this lower frequency range, which includes the portable cellular phone transmit frequencies.[22,23,24]

Diathermy treatment experiments conducted at 750 MHz and 915 MHz yield energy absorption and tissue-heating characteristics so similar as to be indistinguishable.[25] The researchers who performed these particular experiments found that deep tissue heating is obtained at either frequency without significant heating in the surface tissues.

It is important to note that researchers interested in characterizing the performance of diathermy applicators will naturally conduct experimental research at those frequencies authorized for diathermy use. That's why nearly all of the diathermy energy absorption work is performed at about 750 MHz, 915 MHz, or 2,450 MHz. In the preceding work the researchers confirmed that

---

[22] J. F. Lehmann, et al., "A Comparative Evaluation of Temperature Distributions Produced by Microwaves at 2,456 and 900 Megacycles in Geometrically Complex Specimens," Archives of Physical Medicine and Rehabilitation (October 1962):502-07.

[22] A. W. Guy, et al., "Therapeutic Applications of Electromagnetic Power," Proceedings of the IEEE 62, no. 1 (January 1974):55-75.

[24] J. F. Lehmann, et al., "Comparison of Relative Heating Pat-9 terns Produced in Tissues by Exposure to Microwave Energy at Frequencies of 2,450 and 900 Megacycles," Archives of Physical Medicine and Rehabilitation, February 1962, pp. 69-76.

[25] J. F. Lehmann, et al., "Evaluation of a Microwave Contact Applicator," Archives of Physical Medicine and Rehabilitation, March1970, pp. 143-46.

there is no difference in the energy absorption characteristics between 750 MHz and 915 MHz.

Of course, for diathermy treatment tissue damage is undesirable. But some researchers began to develop an idea that heating cancerous tissue to destruction could be a useful technique in the treatment of tumors. This technique is known as hyperthermia therapy. Hyperthermia has been defined as any temperature in human tissue exceeding 41°C, but not including fever or heatstroke. Research has concluded that the frequency range of greatest energy penetration and practical hyperthermia application extends from about 100 MHz to 1,000 MHz.[26]

Although 915 MHz is authorized in the United States for hyperthermia, researchers have found that 750 MHz is also a good choice due to the excellent deep energy absorption at that frequency.

By their nature the frequencies that provide the best therapeutic heating would also be frequencies that could be most hazardous to man in an uncontrolled situation.[27]

High absorption in inner tissue such as the brain occurs while fat and bone absorption is many times less. That is, radiofrequency radiation passes through fat and bone to be absorbed within the brain. Researchers note that

---

[26] *J. G. Short and P. F. Turner, "Physica1 Hyperthermia and Cancer Therapy," Proceedings of the IEEE 68, no. 1 (January l980):133-42.*

[27] *C. C. Johnson and A. W. Guy, "Nonionizing Electromagnetic Wave Effects in Biological Materials and Systems," Proceedings of the IEEE 60, no. 6 (June, 1972):692-718.*

"local lesions of the skin and underlying tissues due to thermal arrears from microwave exposure have been observed. These microwave burns tend to be deep, like fourth-degree burns, due to the deep penetration of the energy". (see footnote 27).

They also remind us that the heating characteristics of RF energy provide deep heating of 43°C-45°C, which is in the range where tissue destruction occurs. Human brain tissue is even more susceptible—perhaps the most sensitive—to increases in temperature. Brain tissue can begin to suffer damage with a temperature increase of as little as (0.5°C).
Particularly, it is known that radiofrequency energy absorption causes heating in tissue that has three primary effects: (1) tissue destruction and death; (2) inhibition of normal cell growth through depression of enzyme activity; and (3) increase in membrane permeability. This last effect is the low-level exposure—induced effect being researched by Adey and others.

As if the energy absorption issue itself weren't enough, there is considerable evidence that radiofrequency energy exposure may inactivate enzymes or proteins that are involved in the repair process to correct DNA breaks. As long ago as 1980 it was proposed that radiofrequency energy exposure was responsible for inhibiting repairs to DNA.

7

Researchers have confirmed that localized hyperthermia is much easier to induce using radiofrequency energy deposition than with other methods. Further, they reported

that. 915 MHz is suitable to heat more massive and deeper tissue. Using 915 MHz radiation researchers have found that they can focus energy absorption into highly localized regions of deep penetration up to 6 cm.[28] By focusing the energy into a "hot spot" the amount of power required from an energy source is reduced by a factor of more than 20. Conversely, this means that an energy-radiating element, such as an antenna, can provide enhanced focused energy deposition.

The destructive effect of heat on malignant as well as healthy tissues is a function of the temperature to which the tissue is raised.[29]

In similar research at other universities, techniques were developed for deep tissue absorption of 915 MHz energy by using antennas.[30,31,32]
This knowledge of the deep penetration of radiofrequency radiation has made hyperthermia very attractive. 'The frequency range 700-950 MHz continues to be the

---

[28] C. Q. Wang and O. P. Gandhi, "Numerical Simulation of AnnuIur Phased Arrays for Anatomically Based Models Using the FDTD Method," IEEE Transactions on Microwave Theory and Techniques MIT-37, no. 1, (January 1989):118-26.
[29] F. Sterzer, "Localized Hyperthermia Treatment of Cancer," RCA Review 42 (December 1981):727-51.
[30] A. W. Guy, et al., "915—MHz Phased-Array System for Treating Tumors in Cylindrical Structures," IEEE Transactions on Microwave Theory and Techniques MTT-34, no. 5 (May 1986):502-07.
[31] A. M. Tumeh and M. F. Iskander, "Permost studied. However, in the United States 915 MHz is the authorized industrial, scientific, and medical frequency. Researchers, therapists, and oncologists would prefer to use a frequency around 850 MHz since that is the region for maximum energy absorption by living tissue.
[32] P. F. Wahid, et al., "Multidipole Applicators for Regional and Whole-Body Hyperthermia," Proceedings of the IEEE 70, no. 3 March 1982):311-13.

most studied. However, in the United States 915 MHz is the authorized industrial, scientific, and medical frequency. Researchers, therapists, and oncologists would prefer to use a frequency around 850 MHz since that is the region for maximum energy absorption by living tissue.

The frequency range of portable cellular telephone transmissions, 825-845 MHz, was not deliberately chosen to coincide with the most dangerous frequency range known. to man. It was selected because that is the frequency range alloted by the Federal Communications Commission. It may just be coincidence that the manufacturers also possessed a very strong engineering capability at that frequency range. They were already selling mobile radios in the 800 MHz frequency range. That eliminated any need to develop an expertise at a new frequency range. And as anyone familiar with communications and radio engineering knows, shifting to an unknown frequency range brings with it an entirely unknown package of new problems. No doubt the manufacturers have experienced such a new problem set while developing the new personal communications system (PCS), which will operate in the 1700-1900 MHz range. In any event, the 825-45 MHz frequency band was either by accident or by deliberate act the best for the manufacturers and the worst for the consumers. As we have learned, even at the time that the frequency allocation was made the research results clearly indicated the danger.

8

The birth of RF and microwave frequency diathermy and hyperthermia, both of which are controlled clinical exposures, coincides with many uncontrolled exposures. Operators of equipment were exposed to the energy in a way

that was not well known or prescribed. Such uncontrolled exposures are similar to exposures that occur with operation and maintenance of radar systems and communication systems.

Lehmann, Stonebridge, and Guy have advised that

> ***Undesirable side effects of diathermy treatment would include formation of cataracts, degenerative changes of the gonads, and brain damage . . .*** [33]

Earlier research had confirmed the formation of cataracts due to radiofrequency radiation exposure. So, diathermy treatment therapists were considered susceptible to the harmful effects of radiofrequency radiation emitted from the applicators. The concern about brain damage is partly from knowledge that brain tissue readily absorbs energy in the 700-950 MHz frequency range and is also very sensitive to temperature variations. This concern is significant. By comparison radiofrequency energy exposures to diathermy therapists are lower than those experienced from operation of portable cellular telephones.

The maximum allowable stray field exposure levels for diathermy applicators are set at a radiation level of 5 mW/cm^2. No such restriction is placed on portable cellular telephones, which typically expose operators to radiation levels of 10-20 mW/cm^2.

The researchers recommended that the manufacturers of diathermy devices should indicate the maximum safe distances and directions that must be maintained by therapists. Of course, the subject undergoing treatment

[33] *J. F. Lehmann, et al., "A Comparison of Patterns of Stray Radiation from Therapeutic Microwave Applicators Measured Near Tissue-Substitute Models and Human Subjects," Radio Science 14, no. 6S (November-December 1979):271-83.*

is not maintaining any distance. However, if there must be defined some safe distance to be maintained from devices emitting 5.0 mW/cm² then certainly we might expect some safe distance to be kept from devices emitting higher levels of radiofrequency radiation - portable cellular telephones. This should be especially true when the spacings are being considered with reference to the human brain.

9

Research reports clearly show that in order to feel any sensation from cellular telephone radiofrequency radiation the energy level would be high enough to cause tissue destruction - prior to noticing any heating sensation.
That's because the radiofrequency energy from a portable cellular telephone is absorbed deep into tissue such as
the human brain. Since the human brain has little, if any, sensory capability, damage or trauma occurring internally will not be felt until the effects, such as heating, are so severe that they work their way outward. If tissue damage occurs within a localized region of the brain it may be completely unnoticed - for the present, that is. These researchers also confirmed that the threshold for irreversible skin damage is about 45°C.[34] which is also the temperature at which pain is felt. So, by the time a person, exposed to radiofrequency radiation, feels pain at the skin that skin is irreversibly damaged, as is the deeper tissue beneath the skin. They also pointed out

---

[34] *J. F. Lehmann, et al., "Comparison of Relative Heating Patterns Produced in Tissues by Exposure to Microwave Energy at Frequencies of 2,450 and 900 Megacycles," Archives of Physical Medicine and Rehabilitation, February 1962, pp. 69-76.*

that excessive internal heating of muscle tissue is not felt as an burning sensation; it is noticed as a dull aching sensation. Similarly, internal heating of brain tissue would not be sensed as a burning sensation. Likely, there would be no sensation at all.

Interest in the ability to "sense" the presence of high levels of radiofrequency radiation motivated researchers to determine threshold levels for detecting heat sensations due to radiation exposure.[35] These researchers found that at 2,450 MHz a minimum exposure to a power density of 26.7 mW/cm² was necessary to induce a sensation of heating in a test subject. This is very close to the previously reported exposure levels for threshold of warmth sensation at 2,450 MHz. Recall that 2,450 MHz radiation has been found to deposit energy mostly near the surface, whereas 845 MHz energy is deposited into deeper tissue layers. The researchers concluded that "the same set of superficial thermoreceptors was being stimulated" as were stimulated by infrared energy heating. Not surprisingly, infrared energy exposure was detected at a much lower power density of only 1.7 mW/cm2. Research shows that as the frequency is reduced the power density required for a sensation of warmth increases. Infrared energy has a much higher frequency than 2,450 MHz.

At 845 MHz the threshold for sensation shifts to a much higher level. That is, one must be exposed to dramatically higher levels of radiofrequency radiation at 845 MHz before the warmth sensation is noticed. With 845 MHz radiation exposure the threshold power density for

---

[35] *D. R. Justesen, "A Comparative Study of Human Sensory Thresholds: 2450-MHz Microwaves vs Far-Infrared Radiation," Bioelectromagnetics 3, no. 1 (1982):117-25.*

sensation of warmth occurs at about 90 mW/cm². Such a high power density level is enough to cause severe destruction to deep tissue.

There is a broad range of potentially lethal exposures below that level that would remain undetected by thermal sensations. Considering our previous discussion of the lack of sensory detectors in the brain, we can expect that no warning of brain tissue destruction would be provided to a cellular telephone user until the damage was so extensive that the scalp, which absorbs very little energy, sensed heating.

10

In an unusual report a product manufacturer provides information related to the "unexplored" area of heating of simulated tissue. It's curious that the researchers should describe the technical area as unexplored, particularly in view of the full body of prior research, only some of which has been described here, and in view of the many products the manufacturers have in the marketplace. Their measurements indicate that radiation exposures could exceed a power density of 10 mW/cm². There is value in the research as they observed and documented an energy absorption "hot spot" associated with high electric fields at the tip of their antenna.

A health hazard is present in the event that the user places the tip of the antenna in the immediate vicinity of the eye.[36]

---

[36] *Q. Balzano, et al., "Heating of Biological Tissue in the Induction Field of VHF Portable Radio Transmitters," IEEE Transactions on Vehicular Technology VT-27, no. 2 (May 1978):51-6.*

This stems from their findings of high energy absorption caused by the very high electric fields at the antenna tip.

These researchers have also noted that the maximum SAR exists at the antenna "feed-point"—the connection point where the energy is fed into the antenna.
For many antennas the feed-point is located some distance above the bottom of the antenna and would also correspond to the place where the antenna is closest to an
operator's head. Now, in addition to internally generated "hot spots" related to head structure, the industry researchers have defined that the antenna structure itself is responsible for introducing another radiation absorption mechanism. This industry research team recites that the fields deposit, "most of their penetrating power in the deeper muscle or brain tissue."[37] They also concluded that

these antennas are capable of depositing high levels of power density in small areas around the feed-point if the radiator is held very close (less than 0.5 in) to the operator.

One striking example of the penetrating effects of radiofrequency radiation comes from a 1979 report that describes how the energy can be used to kill laboratory rats using only a one- to five-second exposure. The researchers claim that the "in-depth heating" provides a "promising approach." They stated that for the purposes of killing the animals

It soon became evident that it would be preferable to focus the microwave energy into the head of the

[37] *Q. Balzano, et al., "Energy Deposition in Simulated Human Operators of 800-MHz Portable Transmitters," IEEE Transactions on Vehicular Technology VT-27, no. 4 (November 1978):174-81.*

animal, thereby increasing the efficiency of the energy delivered to the brain.[38]

The idea was to kill the animals as quickly as possible to prevent unwanted changes in the brain structure and to induce only the desired changes. The high intensity radiofrequency radiation provided the necessary deep absorption to kill rats in one to five seconds and mice in less than one second.

One of the problems these researchers encountered was that the animals' brains did not absorb the energy uniformly. Some areas absorbed more and achieved the desired level of "deactivation" quickly. The researchers did not investigate these areas as "hot spots," since they were looking for rapid absorption throughout the brain - the quicker the better. Their solution: apply the radiation long enough to inactivate the entire brain, not just the "hot spots."

11

N. Kuster reported during 1993 that the maximum SAR measured in models of human heads exposed to one watt of energy was greater than 5 mW/g.[39] The antenna that he employed was located at 2.5 cm (about one inch) from the side of the human head models. His graphical representation of the energy absorption profile clearly shows

---

[38] J. L. Meyerhoff, et al., "The Inactivation of Rodent Brain Enzymes in Vivo Using High—Intensity Microwave Irradiation," Proceedings of the IEEE 68, no. 1 (January 1980):155-59.

[39] N. Kuster, "Multiple Multipole Method for Simulating EM Problems Involving Biological Bodies," IEEE Transactions on Biomedical Engineering BME-40, no. 7 (July 1993):611-20.

the high level of energy absorbed into the head and brain in the region very close to the antenna location.

A semispherical region of the simulated brain nearest the location of the radiating antenna absorbs in excess of 5 mW/g. Proceeding inward, more deep into the brain, is a region of energy absorption in the 2-5 mW/g range that penetrates to a depth of about 2 cm. Continuing farther into the brain is a region of energy absorption of 1-2 mW/g, which extends to a depth of about 3 cm. This continuous diminution of the magnitude of absorbed proceeds throughout the extent of the brain. Clearly, the most dramatic and worrisome revelations point out the very high energy absorption levels on the side closest to the antenna.

Other data also shows very high SARs for a standard portable telephone antenna.[40] We have earlier discussed that researchers find increased SARs close to the place on the antenna where the power is fed into the antenna, the antenna feed-point. In this case the researcher reports SARs greater than 20 mW/g at regions near the antenna feed-point. Yet, that high SAR level does not take into account any of the internal enhancement mechanisms.

At about the same time that Kuster released his research findings, December 1993, O. P. Gandhi publicized findings of his own that were contradictory.[41] He reported that the maximum SARs within the human brain would be about thirty times lower than what Kuster had reported. But by March of 1994 the word in the research

---

[40] N. Kuster, "Progress in High Frequency Dosimetry," 2d Congress of the European Bioelectromagnetics Association, December 9 l l, 1993, conf. abstracts, p. 2.

[41] O. P. Gandhi, Electromagnetic Absorption in the Human head for Cellular Telephones, unpublished communication to the Federal Communications Commission, October 22, 1993.

community had spread that the Gandhi team had, in fact, reported incorrect SAR numbers and were about to release a correction revising their "results" upward considerably.

During the 1994 Bioelectromagnetics Society 16th Annual Conference, held in June of that year, Gandhi produced findings of still higher maximum SARs for the same research. During his presentation, SARs corresponded, at times, to levels as much as ten times higher than were previously reported. The conference results, presented in Copenhagen, Denmark, never reached the U.S. audience. In a letter to the Federal Communications Commission of August 1994, Gandhi explained the nature of the errors and revised his experimental results upward. That is, nearly a full year after the initial false claims of safety—and almost six months after his revisions first became known—the Gandhi team provided, an official correction.

Their computer simulations and experimental findings now admit to radiation absorption of about 60 percent in the neck and head of portable cellular telephone users.[42] That is about four times higher than the original data. Their highest SAR numbers are now about ten times higher than was the case with the previous data. Their full-color slides of operator exposure to 835MHz radiation show significant energy absorption and pronounced thermal "hot spots" located at the temporal lobe and parietal lobe corresponding to the location of the radiating antenna. In conversations with Gandhi, he has stated that as a result of the widespread reporting of high radiation

---

[42] *O. P. Gandhi, et al., "Electromagnetic Absorption in the Human Head for Cellular Telephones," 16th Annual Bioelectromagnetics Society Meeting, June 12-17, 1994.*

absorption rates, in some cases as much as 90 percent, he has been working for some manufacturers to redesign the portable cellular products. The purpose, as he has stated, is to reduce the objectionably high energy absorption into the user's head.

> ***When close to a narrow source of microwave leakage, one may get up to 100% efficiency of coupling to the target. However, as one moves away from the source, the coupling diminishes rapidly, first due to reduction of field strength . . . and secondly due to the reduction in coupling because of the larger effective width of the fields.*** [43]

When considering exposure to a portable cellular telephone antenna the same highly efficient coupling effect occurs. The coupling of a "target", in this case the human head and brain, to a radiofrequency energy source allows for efficient flow of the energy from the source into the target

12

A. W. Guy and C. K. Chou experimented with 915 MHz energy to study the affects of high energy pulses on brain tissue. Above a "threshold" level the rats they used exhibited seizures and were rendered unconscious. That in itself is not surprising since the radiation exposure elevated the brain temperature significantly. The surprising data come from the pathological findings taken

---

[43] *O. P. Gandhi, et al., "Electromagnetic Absorption in a multilayered Slab Model of Tissue under Near-Field Exposure Conditions," Bioeletromagnetics 1, no. 4 (1980):379-88.*

one month after exposure. At that time two of the rats were sacrificed (killed) and their brains were examined; Both rat brains were swollen. Glial nodules (tumors) were also found in both rat brains. Remember that this was one month after the radiation experiments. They wrote:

> ***One month later the only pathological findings in two exposed rats were that the brains appeared'swollen and in one rat a few microfocal glial nodules were present in the basal ganglia anterior to the optic nerves, while in another a single microfoal glial nodule appeared in the cerebral cortex.44***

Of course that is the correct description for small brain tumors**.**

These findings are of extreme importance because the researchers reported no residual effects immediately after the exposures. However, as part of the program's radiation exposure experiments the researchers followed up with a histological examination and found tumor growth one month after the rats assumed normal activity. Not only that, but the brains were still swollen one month after the exposure. Of the rats that were sacrificed and examined, the researchers initially found no visible differences when compared to controls (nonexposed rats). It was a closer microscopic examination that revealed the growths.

This certainly indicates that determinations of pathological effects should be from a long-term view. That is, only after months, or even years, will the full

---

[44] A. W. Guy and C. K. Chou, "Effects of High-Intensity Microwave Pulse Exposure of Rat Brain," Radio Science 17, no. 5S (September—October 1982):169S- 178S.

effects of radiofrequency energy exposure become known. In this case they found that what might have been said to be perfectly normal test subjects had in reality developed brain tumors. According to the measurement criteria in use at that time, the rats "appeared" to recover from the exposure. Thus the researchers might have recorded that no irreversible effects were noted.

However, those researchers looked further. Specifically, the researchers stated,

> ***Histological examinations of some of the animal brains indicated some demyelination of neurons one day after exposure and some microfocal glial nodules in two of the rat brains one month after exposure.***[45]

In addition to producing undesirable brain injury, radiofrequency radiation may be employed as a technique for deliberately producing brain lesions. One procedure includes implantation of a small piece of metal into the brain. After the metal implant is in place the subject is exposed to radiofrequency radiation that results in sufficient heating at the location of the implant so that tissue is destroyed.[45]

Researchers previously knew that the presence of metal objects within tissue would result in excess heating because more RF energy would be absorbed at that spot. The implanted metal "seeds" provide a controlled location for the increased heating and tissue destruction. Individuals with metallic implants may be well advised to take heed of what has been reported.

---

[45] *J. C. Lin, "Induction Thermocoagulation of the Brain-Quantitation of Absorbed Power," IEEE Transactions on Biomedical Engineering, November, 1975, pp. 542-46.*

Metal-framed eyeglasses, metal implants, orthodontic braces, and even metallic jewelry worn about the head will also modify the radiation absorption. The modifications can result in significantly higher energy absorption at small, localized regions of the head and brain.

13

From another report of industry-conducted research we get some idea of the magnitude of electric fields in close proximity to transmitting antennas. The research was prompted by concerns raised related to excess radiation exposures and in part as background for the meetings of the IEEE/ANSI safety standard committee. Instead of providing proof that the electric fields in the close proximity to transmit antennas were safe, the experimental and theoretical results show that the field intensities near, some parts of a transmitting antenna are higher than predicted.

The researchers state in the publication that

the study of the near field has been substantially neglected.[46]

Thus it comes from the industry that the most important aspect of research related to portable transmitters has been, in its own words, "neglected."

Dipole antennas, although extensively used in portable and mobile communications, have not been carefully investigated in the near field.

---

[46] *Q. Balzano, et al., "Energy Deposition in Simulated Human Operators of 800 MHZ Portable Transmitters," IEEE Transactions on Vehicular Technology, VT-27 no. 4 (November 1978):174-81.*

The proposed standard recognizes the possibility of encountering fields higher than the maxima of the Protection Guides in the close vicinity of low power radiators, like portable communication equipment. For this reason, an exclusion clause for devices operating at 1 GHz or less and with less than 7 W output power has been proposed." (See footnote 46)

Those researchers have confirmed, by their own measurements, the electric field enhancement effects reported earlier by Iskander and others.

In the near-zone of some radiating antennas there is a large amount of stored energy that is disposed immediately around the antenna. This stored energy is found in what are known as induction zone electric and magnetic fields. For communications purposes stored energy is useless and is considered an undesirable part of a transmitting antenna system.

One method commonly used to obtain selective heating for diathermy and hyperthermia therapy is to expose human tissue to the stored RF energy in the near-zone fields (induction fields) of an energy source. Researchers have repeatedly confirmed that RF energy can be absorbed from the induction fields in the near-zone. However, both therapeutic benefits and cell damage in biological tissues stem from conversion of electromagnetic energy into heat.

Some years before portable cellular phones made their way beyond the industry research labs, researchers reported that as little as 250 microwatts (0.00025 watts) radiated power would be enough to exceed the safety standards when using a helix antenna as the radiator for

near-zone exposure.[47] The helical antenna is commonly employed with portable phones when a user prefers a shorter antenna. A disadvantage of the shorter helical antennas is that they store tremendous amounts of energy in the near-zone.

For example, the helical antennas that those researchers used for their experiments stored ten times as much energy in the near-zone as was radiated. In terms of the allowed radiated energy for a portable cellular telephone, that means the near-zone stored energy equals about six watts. With an operator's head and brain in the near-zone a significant portion of that energy will be drawn into and absorbed by the head and brain of the operator.

Claims of safety, based on the fact that the portables only emit 0.6 watts of power, always neglect to factor in the much higher energy absorption that is available from the stored energy.

The industry researchers warn that

> ***if safety standards of independent and government agencies do not take into account the peculiar nature of the electromagnetic energy in the close vicinity of some radiating devices, it is conceivable that the power of portable two-way communication equipment might be forced down to useless levels.***

They suggested that electromagnetics in the nearzone of antennas is somehow different than elsewhere in the universe. Their proposition is that since they don't

---

[47] *Q. Balzano, "The Near Field of Omnidirectional Helical Antennas," IEEE Transactions on Vehicular Technology·VT-31, no. 4, (November 1982):173-85.*

quite understand the physics relating the electromagnetic fields to the near-zone of antennas, safety standards should not be enforced because it would be detrimental to the industry.

Those researchers have found that exposure to the helical antennas yields a power density of as much as 127 mW/cm² when the antenna is placed about 1 cm distant. The radiated power was only 0.02 watts. That's thirty times less than radiated from a portable cellular telephone. Yet the power density was more than one hundred times higher than would be allowed under the exposure limits for a microwave oven. The researchers observe that "this last value should be considered extremely dangerous biologically; yet, in the near field of an antenna, such apparent power densities are reached with only 20mW of radiated power."

Clearly, they comprehended the danger that their own research findings were yielding. They concluded that in order to meet the safety standard, the helical antenna which they employed could radiate no more than 0.00025 watts. That's 2,400 times lower than portable cellular telephones are allowed to emit.

Some antennas are specifically designed to use the nonradiating induction energy for penetration into humans.[48] One such antenna was specifically developed to provide an improved method for depositing energy into tissue for hyperthermia treatment.

Notably, the researchers of that antenna reported that the greatest energy absorption peak is the result of stored energy deposited into the tissue. That is, some of

---

[48] *F. Montecchia, "Microstrip-Antenna Design for Hyperthermia Treatment of Superficial Tumors," IEEE Transactions on Biomedical Engineering BME-39, no. 6 (June 1992):580-88.*

the nonradiating energy that is stored around the antenna is deposited into the tissue and results in greater heating than the radiated energy. Both the radiation energy and stored energy absorption take place deep within the tissue with measurable temperature rises more than 10 cm into the tissue. Surprisingly, moving the location of the antenna to 3.0 cm distance, as compared to the original 1.5 cm, has only a small effect on the existence of a "hot spot," which is primarily due to the absorption of stored energy.

This finding is interesting since it gives some indication of energy absorption even as the antenna is moved farther from the absorbing tissue. For portable cellular telephone use, some antennas will still deposit significant stored energy into the head and brain even as the spacing is increased by a few centimeters. This research has verified, once again, that the frequency range that includes the portable cellular telephone transmit frequencies is excellent for depositing energy deep into biological tissue. Others have confirmed the efficient absorption of stored energy with their research of rats irradiated at 918 MHz.[49] Their purpose was to characterize the conditions of radiofrequency radiation exposure that led to convulsions in rats. They found that by using deep-penetrating radiation the surface temperature of the rats could be kept low while brain temperature could be elevated to induce convulsions.

14

On August 31, 1990, an antenna technician, Keith Angstadt, was exposed to radiofrequency radiation that

---

[49] *D. L. Hjeresen, et al., "A Microwave-Hyperthermia Model of Febrile Convulsions," Bioelectromagnetics 4, no. 4 (1983):341-55.*

led to color blindness and his loss of night vision. He contacted doctors at Johns Hopkins University's Wilmer Institute for help with his eye injuries. Doctors at the institute, "deduced that the retinas of his eyes had sustained 5mW/cm² of continuous wave radiation for two I5 minute periods" [50] Further, the doctors at the Wilmer Institute were quoted as saying that he "suffered more microwave exposure than any human being ever studied by scientists." So how does that relate to the issue of radiofrequency radiation from portable cellular telephones?

The radiation from portable cellular telephones is acknowledged to be deposited deep within brain tissue. The power density to which operators of portable cellular telephones are exposed is higher than that to which Keith Angstadt was exposed. A primary difference is that 6,000 MHz energy was directed at the face and eyes of Mr. Angstadt. By now we know that the higher-frequency 6,000 MHz radiation would not penetrate as deep into tissue as 845 MHz radiation. Nevertheless, the penetration of the 6,000 MHz energy was sufficient to produce serious eye damage.

The conclusion of the Johns Hopkins University staff was that the radiofrequency radiation absorbed by Mr. Angstadt was responsible for his injuries. Should consideration of similar, and higher, levels of radiofrequency energy absorption into the brains of millions of cellular telephone users provide the same conclusion?

---

[50] *"Technician Exposed to MW Radiation Files $5 Million Suit," Microwave News 12, no. 6, (November—December 1992) p. 11.*

15

This solid body of evidence that has been built as a research foundation during the 1950-95 time period confirms over and over again what has been established throughout the period. That is: (1) portable cellular telephones expose operators to dangerously and highly damaging levels of radiofrequency energy absorption; (2) the manufacturers, service providers, government, and scientists have been aware of the hazards; and (3) the manufacturers, service providers, and government have not warned the owners of portable cellular telephones.

Instead, industry and government have chosen to concentrate the arguments about safety on the nearly impossible task of proving that low-level radiofrequency radiation does or does not cause cancer. By focusing attention on this type of research the industry can avoid addressing the known facts.

2

"Hot Spot" Radiation Absorption

There are many cases where the belief system is so absurd that scientists dismiss it instantly but never commit their arguments to print. I believe this is a mistake. Science, especially today, depends upon public support. Because most people have, unfortunately, a very inadequate knowledge of science and technology, intelligent decision making on scientific issues is difficult. Some pseudoscience is a profitable enterprise, and there are proponents who not only are strongly identified with the issue in question but also make large amounts of money from it. They are willing to commit major resources to defend their contentions. Some scientists seem unwilling to engage in public confrontations on borderline science issues because of the effort required and the possibility they will be perceived to lose a public debate.

- C. Sagan
Broca's Brain

1

The human head is a complex structure of many different tissue types. Each of the tissues—skin, bone, cerebro-spinal fluid, fat, brain, dura, and others—absorbs and reflect

RF energy. But the amount of absorption and reflection is different from one tissue type to another. In addition, the human head is far from being a uniform structure.

The skull itself is a virtual landscape of ridges and bony prominences on its interior surface. These ridges and prominences, in addition to seams, are accompanied by areas of varying thickness. A quick look in any reference encyclopedia or anatomy reference will show that the inner structure of the human head exhibits some very pronounced interior ridges in addition to void (empty) areas such as the mastoid region.

Surrounding the skull, beneath the scalp, is a layer of subcutaneous fat. The thickness of that fat layer is different from person to person. Within the skull, of course, is the brain, which is held inside the meninges. We know the brain is also comprised of folds and seams.

All of these features in the internal landscape of the human head, in addition to the fact that head size also varies considerably, cause any penetrating RF radiation to be absorbed in a manner which depends strongly on the features of the head. In many instances the RF energy will interact with human head features in a way that directs and concentrates the absorption into small areas rather than being distributed uniformly throughout.

In 1955, researchers H. P. Schwan and G. M. Piersolcp reported that there is danger of causing burns when radiofrequency energy is applied over bony prominences.
Their reasoning for this effect was that nonuniformities such as bone ridges and irregular fat layers cause the energy to be absorbed nonuniformly within the body or head. At "hot spots" excessive amounts of absorbed radiation can cause selective temperature rise of sensitive parts of the body. Consider what this means today, in

view of the previous finding and also in view of hand held portable phones.

For a human head structure this enhancement of absorbed energy is evidence of an energy absorption "hot spot" beneath the skull and at the surface of the brain. At frequencies of 750 MHz and above the absorption would be primarily in the brain tissue.[51] Again, considering a human head, this research points out that the radio-frequency energy, in a broad range from about 500 MHz to 1,000 MHz, is preferentially deposited beyond the skull and absorbed into the brain.

Energy absorption "hot spots" of greater than ten times the overall average have already been described for a bone/brain interface. Many other "hot spots" within the human head are also well known.

Some interior "hot spots" are related to the radius of curvature of the human head. Other reasons for "hot spot" formation will be described subsequently, including the nonuniformities of skull structure and brain tissue within the head.

2

It only takes a very short time to destroy living brain tissue. RF energy absorbed within a fraction of a second can be enough to damage and modify the structure of brain cells and molecules. For example, a few seconds of intense exposure is enough to kill laboratory rabbits with radiofrequency radiation. Researchers noted that

[51] H. P. Schwan and G. M. Piersol, "The Absorption of Electromagnetic Energy in Body Tissues." Iriterriatiorial Review of Physical Medicine and Rehabilitation (June 1955):424-48. l A

experiments in which the head area alone was directly irradiated suggest that the fatal outcome was the result of an excessive rise in brain temperature. The lethal effects of irradiation to a limited area of the body are different from those in which the entire animal is exposed.[52]

That warning was first provided in 1952.

Some researchers have reported that in order to obtain selective "hot spot" heating, it is necessary to expose the tissue to the near-zone fields of the energy source.[53]
From their experimental data at 433 MHz, 750 MHz, and 918 MHz these researchers confirmed that energy is readily absorbed from the induction fields in the nearzone. The absorption within the brain was found to be about twenty times greater than in the skull and subcutaneous fat. That is certainly consistent with all of the earlier reported research.

J. C. Lin, Guy, and Caldwell performed thermal studies of rat bodies radiated in the near-zone.[54] Their meaurements indicate an energy absorption (SAR) of 0.9 mW/g for a power density of only 1 mW/cm². They proposed that nonthermal effects may be masked by heating and that, even at low power density, absorption at local "hot spots" may produce thermal stimulation. This concept has serious implications. These researchers have

---

[52] H. M. Hines, and J. E. Randall, Electrical Engineering, 71 (1952):879

[55] A. W. Guy, "Analyses of Electromagnetic Fields Induced in Biological Tissues by Thermographic Studies on Equivalent Phantom. Models," IEEE Transactions on Microwave Theory and Techniques MTT—19, no. 2 (February 1971):205-14. '

[54] . C. Lin, et al., "Thermographic and Behavioral Studies of Rats in the Near Field of 918-MHz Radiations," IEEE Transactions on Microwave Theory and Techniques MTT-25, no. 10 (October 1977):833-36. -

proposed that, even at low absorption levels microscopic “hot spot" destruction may be occurring unnoticed.

In one experiment 0.1 mW/cm² average power density resulted in 140 mW/g "hot spots" in radiated animals. Considering that they had earlier determined that 0.1 mW/cm² should result in an SAR of 0.09 mW/g, this latest finding indicates the presence of "hot spots" with enhancement of more than 1,500 times the expected level.

An important point brought out by this particular series of experiments is that within actual test subjects, whether laboratory animal or humans, RF energy can be concentrated into very high-intensity spots just as sunlight may be concentrated with a magnifying glass. Most of us are familiar with the intense heating effect of concentrated sunlight. The same intense effect occurs within living tissue at radiofrequency radiation "hot spot" locations.

These researchers used a power density level that was about one hundred times less than a human receives during portable cellular phone operation. Even so, the SAR 140 mW/g, was so high that tissue destruction would have been nearly immediate. For human brain tissue less than 5 mW/g is sufficient to cause a temperature rise that initiates tissue damage.

Lin also acknowledged that energy absorption occurs vary rapidly.[55] So, during short exposures of from a few seconds to a few minutes, very little heat conduction—heat energy movement through the tissue—takes place. This is important in view of "hot spot" absorptions. If a "hot spot" situation exists, rapid energy absorption

---

[55] *J. C. Lin, "On Microwave-Induced Hearing Sensation," IEEE Transactions on Microwave Theory and Techniques MTT-25, no. 7 (July 1977):605-13.*

will have maximum destructive effect because, in accordance with Lin's reported findings, very little of the heat caused by the absorption will have an opportunity to dissipate. As Lin puts it,

> ***Because, microwave absorption occurs in a very short time, there will be little chance for heat conduction to take place.***

The conduction of heat takes much longer. Alternatively, he advises that

> ***the temperature decay is therefore a slowly varying function of time . . .***

What we expect then is rapid heating and slow cooling. At "hot spots" the inability of biological tissue to get rid of excess heat quickly and efficiently may yet be another mechanism leading to destructive exposure, even at levels previously thought to be incapable of raising tissue temperature.

If "hot spots" occur at localized or microscopic regions within the brain, where there are no thermal or sensory receptors, there is no reason to expect that the body will attempt to compensate for the overheating. The human brain simply does not have the capacity to prevent the damage.

There are, of course, exposures that will result in "hot spot" damage that is significant enough to be readily observable. There is also another less noticeable type of "hot spot" damage. Microscopic "hot spots" can selectively destroy or damage tissue and leave no outwardly visible traces of that damage. In the previous chapter exactly

this type of microscopic "hot spot" damage was described and documented.

Humans operating RF radiating devices expose themselves to similar damage. Within the human brain the regions most closely associated with RF radiation exposures, the temporal lobes, are also the regions most tolerant to damage—that is, most tolerant in the sense that one would never know of an injury. It is possible to continually create uncountable millions of microscopic injuries within these regions and yet the damage could go unnoticed externally even with MRI or CT examination. But the damage would produce an effect internal to the injured person.

Recall what we learned earlier from Michaelson and consider it once again within the context of virtually millions of microscopic brain cell injuries:

> ***It should be understood that a cumulative effect is the accumulation of damage resulting from repeated exposures each of which is individually capable of producing some small degree of damage. In other words, a single exposure can result in covert thermal injury, but the incurred damage repairs itself within a sufficient time period, for example hours or days, and therefore is reversible and does not advance to a noticeable permanent or semi permanent state. If a second exposure or several repetitive exposures take place at time intervals shorter than that needed for repair, damage can advance to a noticeable stage.56***

56 S. M. Michaelson, "Human Exyiosure to Nonionizing Radiant Energy—Potential Hazards and Safety Standards," Proceedings of the IEEE (April 1972):389-421.

3
Recall that hot spot absorption is a term that researchers themselves have taken to describe exactly what is happening at specific locations within the brain—or any other tissue mass. That is, excess radiofrequency energy is being deposited into some small region of the brain. Which regions of the brain will be subjected to "hot spot" absorption depends on a number of factors related to head size, shape, curvature, subcutaneous fat layer thickness, internal skull structures, and voids within the skull.

Equally important, "hot spots" are dependent on the type of antenna, the physical structure of the telephone, and how the user holds the telephone during operation. All of these variables combine to create a complex matrix of enhancement mechanisms to provide different energy absorption "hot spots" for users. Unless the radiating elements, including antenna and telephone case, are far from the head of the user "hot spots" should be expected.

This information was well understood by cellular telephone manufacturers during the development phase of the 1970s. Their own publications acknowledge as much. In one such infrequent industry report researchers identified an energy absorption "hot spot" located in the temporal region of the human head.

The temperature profiles generated by both antennas inside the head of the simulated operator indicate the presence of a "hot spot" about 1 in below the surface of the temporal bone.[57]

---

[57] *Q. Balzano, et al., "Energy Deposition in Simulated Human Operators of 800-MHz Portable Transmitters," IEEE Transactions on Vehicular Technology VT—27, no. 4 (November 1978):174-81.*

These experiments were performed at 840 MHz, which is within the portable cellular telephone transmit band.

Industry researchers acknowledge the need for concern of operator exposure to radiofrequency radiation because

the 800-900 MHz band is very close to the frequencies used for medical diathermy (918 MHz). Diathermy applicators are well known for efficiently depositing energy deep within human tissue.

They propose that the energy penetrates deep and causes "hot spot" absorption at about one inch below the surface of the temporal bone. Other researchers have confirmed that curvatures of the head will lead to various "hot spots" and that some of the "hot spots" are strikingly pronounced. The industry researchers conclude that

SAR peaks (sometimes called "hot spots") are probably associated with the "focussing" of this EM energy in the frontal bone.

These experiments, conducted in 1978, were performed with a portable radio, not a portable cellular telephone. Therefore, the antenna was located at the front of the head. Comparing the front of the human skull with the rear, we notice that equivalent curved areas of the skull are located at the rear on each side above either par. As such, any focusing mechanism that is described would be identically replicated at the rear portion of the human head. Portable cellular telephone antennas are, most typically, disposed immediately adjacent to one of those curved regions during operation. Surface curvature is of primary importance. The region of the human head above and behind each ear is a

region of small radius of curvature. That is, it curves a great amount. If the curvature of that region were completed into a full ball shape the size would be about 4 or 5 cm in diameter or a radius of 2-2.5 cm. That is well within the range of sizes found by researchers to support "hot spot" generation.

In the region through the width of the head, that is, ear to ear, the thickness is generally less than from front to back. When considering the structures that support "hot spot" generation these surface and structural non-uniformities of the human head are more important than the overall head size.

Consider now the same structural features of the heads of children and smaller adults. The curved area behind and above the ears is more severe, and the total width of the head is correspondingly reduced. Since "hot spot" absorption is a function of head curvature, some humans, both children and adults, are more susceptible with this type of "hot spot" formation. Long before the introduction of cellular telephones, researchers provided data that indicated that children absorb approximately 50 percent more radiation within their heads than do adults.[58] These results are provided for plane-wave, far field exposures and do not consider any of the enhancement effects that are introduced by near-zone operation of cellular telephones. This same research study also shows that thin men absorb about 33 percent more radiation than an average 70 kilogram (155 - pound) man.

---

[58] *C. H. Durney, et al., "An Empirical Formula for Broad-Band SAR Calculations of Prolate Spheroidal Models of Humans and Animals," IEEE Transactions on Microwave Theory and Techniques MTT-27, no. 8 (August 1979):758-63.*

Lin placed the increased absorption effect into a better perspective when he reported that "hot spot" energy absorption can be as much as ten times higher at certain areas within the brain.[59] From experiments performed using models of the human head he reported energy absorptions in the center of the head that were even higher than absorption levels near the surface. This is a prime example of "hot spot" energy deposition.

The presence of nonuniform energy absorption that treated the new type of "hot spot" was initially characterized by H. P. Schwan.[60] The "hot spots" Schwan discussed were somewhat different from those we have considered previously. In the earlier consideration of "hot spots" the focus was on nonuniform radiation, nonuniform absorption characteristics, and nonuniformities within the head. But this researcher performed experiments using various diameter head models.
His conclusions are that as head diameter is reduced energy-absorbing "hot spots" become pronounced. The research found that for heads significantly smaller than that of a mature man the "hot spot" effect increases and so does the amount of energy that is absorbed into the interior of the brain. Clearly this indicates an increased risk of "hot spot" absorption within the brains of women and children, with small children being at maximum risk a "hot spot" absorption within their brains. Keep in mind that this is an additional "hot spot" formation mechanism

---

[59] *J. C. Lin, "Interaction of Two Cross-Polarized Electromagnetic Waves with Mammalian Cranial Structures," IEEE Transactions on Bionedical Engineering BME-23, no. 5 (September 1976):371-75.*
[60] *H. P. Schwan, "Microwave Radiation; Hot Spots in Conducting Spheres by Electromagnetic Waves and Biological Implications," IEEE Transactions on Biomedical Engineering BME—19, no. 1 (Janunry, 1972):53-58.*

that may be present along with the other "hot spot" absorptions described earlier.

Other researchers have recorded this same "hot spot" absorption characteristic across a wide frequency range.[61] They also confirmed that the "hot spot" absorption is dependent on the diameter of the head model that they used. As the diameter decreased the absorption effect became more pronounced. Most notably, the greatest absorption enhancement occurs at frequencies between 800 MHz and 1,000 MHz - effectively covering the portable cellular telephone transmit band.

Researchers also reported that maximum "hot spot" energy absorption enhancements occur in the frequency region around the cellular telephone frequencies.[62,63] Of course, they didn't report their findings as being particularly noticeable for the portable cellular telephone transmit-band, because most of this work took place during the 1970s, from about 1972 through 1976. There were no cellular telephones on the market at that time, but they were under development in the research labs. All of which means that this alarm raised about "hot spot" RF energy absorption related to head size and children has been known in the industry since long before the very first portable was put into the anxious hands of the very first customer.

---

[61] H. N. Kritikos and H. P. Schwan, "Formation of Hot Spots in Multilayer Spheres," IEEE Transactions on Biomedical Engineering (March 1976):168-72.

[62] H. P. Schwan, "Microwave Radiation; Hot Spots in Conducting Spheres by Electromagnetic Waves and Biological Implications, "IEEE Transactions on Biomedical Engineering BME—19, no. 1 (January 1972):53-58.

[63] H. P. Schwan, "Microwave Radiation; Biophysical Considerations and Standards Criteria," IEEE Transactions on Biomedical Engineering BME—19, no. 4 (July, 1972):304-12.

These researchers also reported that the "hot spots" are evident in head sizes up to about 6 1/2 inches in diameter. That's a fairly large head diameter and leads to tho conclusion that since many human heads are smaller than 6 1/2 inches in diameter, many human exposures to cellular telephone radiofrequency radiations would include this type of "hot spot" formation.
With reference to figures that document their research findings C. C. Johnson and A. W. Guy state:[64]

> ***The figures clearly illustrate the intense fields and associated absorbed power density directly in the center of the human head . . . for 918 MHz exposure.***

Available research has already been presented here that verifies that the radiofrequency radiation absorption characteristics of biological tissue are indistinguishable, that is, virtually the same, for both 845 MHZ and 918 MHZ. Whatever absorption characteristics are found at 918 MHZ will also hold at 845 MHZ. Similarly those energy absorption characteristics found to be true at 750 MHZ will also be true at 825 MHZ and again at 918 MHZ. This entire range of frequencies is the same with respect to energy deposition into biological tissue. Usually, as radiofrequency radiation penetrates into the brain it is being absorbed so that as it propagates more deeply there is less remaining and the magnitude, or strength, of the radiation decreases with increasing depth. But this is not the situation' where "hot spots"exist. Johnson and Guy report that, at 918 MHZ the depth

---

[64] *C. C. Johnson and A. W. Guy, "Non Ionizing Electromagnetic Wave Effects in Biological Materials and Systems," Proceedings of the IEEE, 60, no. 6 (June 1972):692-718. C*

of penetration is 3.2 cm, and that's consistent with what we've reviewed earlier. However they found that

> ***...for human brain exposed to 918-MHz power, the absorption at a depth 2.3 times the depth of penetration (depth of penetration=3.2 cm) is twice the absorption at the surface. This corresponds to a factor greater than 200 times that expected . . .***

This means that at a depth within the human brain of about 7 cm (almost 3 inches) "hot spots" were found that produced energy absorption 200 times greater than would be the case if no "hot spot" existed.

More startling is the observation that at this great depth within the brain the "hot spot" absorption is actually two times greater than the absorption near the surface where the radiation is assumed to be strongest.

> ***The regions of intense absorbed power density are due to a combination of high refractive index and the radius of curvature of the model which produces a strong focusing of power toward the interior of the sphere.***

Focusing due to head curvature is held responsible for the "hot spot" absorption. With this knowledge, along with earlier research findings reporting the same results, we can understand how people with smaller or rounder skull shapes may be at increased risks and how people who operate cellular telephones with antennas placed in particularly dangerous positions at their heads could also be in greater danger.

W. T. Joines and R. J. Spiegel[65] expanded experimentation and computations with human head models by working with a structure comprised of six layers: skin, subcutaneous fat, skull, dura, cerebro-spinal fluid, and brain tissue. A total thickness of the five layers that surround the brain is given as 1.10 cm. However, we must keep in mind that the layers, most principally the subcutaneous fat layer, will vary appreciably from one human to another.

Computerized calculations indicate enhanced energy absorption in the six-layer models of the human head compared to what had been reported by earlier researchers. To this point we have noted that developments moving from flat homogeneous models—slabs of simulated tissue—to two layered spherical models and then to six-layer model consistently yield findings of higher RF energy absorption. As the models become more complex and increasingly representative of an actual human head the findings continue to indicate that the energy absorption is much higher than previously thought. Although the primary importance of their work rests with the effects of the multilayered model, these researchers also found that an absorption peak occurs at approximately 750 MHz and near 2,100 MHz for a 7 cm radius sphere.

Interestingly, both of these frequencies are almost exactly where the cellular telephone industry has chosen to operate their portable transmitters. The PCS devices operate near 2,100 MHz—actually in the I700—1900 MHz range.

---

[65] *W. T. J oines and R. J. Spiegel, "Resonance Absorption of Microwaves by the Human Skull," IEEE Transactions on Biomedical Engineering (January 1974):46-48.*

Still other independent researchers reported that "hot spots" are formed inside models of human heads with radius of from 0.1 to 8.0 cm for frequencies between 300 and 1,200 MHz.[66,67] The range of sizes includes almost all human heads. It is clear that what was first observed as a danger to those with smaller cranial structure, and most notably including children, has been extended by additional scientific studies to include nearly all humans. Of course, the most dramatic "hot spot" peaks are within the smaller heads.

D. T. Borup and O. P. Gandhi[68] have published SAR distributions from a computer analysis of the human head. They found that for a plane-wave arriving from the front of the head, distinct energy absorption "hot spots" are shown. This is interesting, since the computer analysis confirms that even plane-wave induced radiation absorption results in interior energy absorption "hot spots." In this instance the observed "hot spots" amount to an energy absorption (SAR) of 0.6 mW/g for an incident power density of 1 mW/cm². At portable cellular telephone power densities, 10-20 mW/cm², the SAR would be 6-12 mW/g—enough to cause substantial temperature rises.

In the near-field, that same incident power density would result in a much higher SAR due to a number of

[66] H. N. Kritikos and H. P. Schwan, "The Distribution of Heating Potential Inside Lossy Spheres," IEEE Transactions on Biomedical Engineering BME —22, no. 6, (November 1975):457-63.

[67] G. H. Wong, et al. "Probing Electromagnetic Fields in Lossy Spheres and Cylinders," IEEE Transactions on Microwave Theory and Techniques MTT —32, no. 8 (August 1984):824-28.

[68] D. T. Borup and O. P. Gandhi, "Calculation of High-Resolution SAR Distributions in Biological Bodies Using the FFT Algorithm and Conjugate Gradient Method," IEEE Transactions on Microwave Theory and Techniques MTT—33, no. 5, (May 1985):417-19.

enhancement factors including the near—zone "matching" effect discussed earlier.

The cellular telephone manufacturers have maintained, until recently, that any radiofrequency energy absorption would be primarily superficial and lead to a sensation of heating before excessive or dangerous levels were reached. Of course, that position cannot be supported in view of the many research findings that show that most of the energy radiated from the phones ends up as absorbed energy in a "hot spot" within the user's brain. Our earlier review of radiation absorption and heat sensation has shown the industry claims to be quite absurd.

In 1955, researchers investigated this very topic and concluded that if the power level was sufficient to produce a "feeling of warmth on the skin, the deep temperatures, which are higher than the superficial ones, will be elevated to a point that may bring about tissue destruction.[69] In those types of experiments the temperature rise in brain tissue is much higher than that of the skin and fat layers.

4

Researchers have also investigated the effects of nearby radiation reflectors. Energy-reflecting surfaces or materials can be thought of in the same way as one would think of a mirror acting on visible light. The same is true with radiofrequency radiation except that the reflecting surface might be a metallic conductor or wire mesh rather

[69] H. P. Schwan and G. M. Piersol, "The Absorption of Electromagnetic Energy in Body Tissues," International Review of Physical Medicin and Rehabilitation, June 1955, pp. 424-48.

than a mirror. In terms of radiation absorption within a person's head, it's somewhat like operating two portable cellular telephones or a single phone at a much higher power setting.

Gandhi has reported experimental research that was performed to confirm the radiation absorption enhancement that occurs when subjects are close to reflecting surfaces.[70] According to theory, as the ratio of the body diameter (such as the diameter of the head) to wavelength is reduced the enhancement factor increases and as the distance from the reflecting surface to the absorbing object decreases the enhancement factor also increases.

Therefore, we would expect that operation of a portable cellular telephone in close proximity to energy-reflecting surfaces, such as automobiles or metal structures, would result in enhanced energy absorption within the head and brain of a user. A secondary effect is that as the signal received by the "cell site" is weakened, the portable will receive coded instructions to increase its radiated power level. This provides even more radiation to be absorbed within the user's head. Gandhi reported a measured energy absorption enhancement factor of as much as 27 in close proximity to corner shaped reflectors and about 4.7 for flat reflectors. The first of these numbers, twenty—seven times greater absorption, is truly astounding. But when we consider that more than 50 percent of the energy radiated by portable cellular telephones is absorbed within the user's head without the presence of a reflector, it becomes clear

---

[70] *O. P. Gandhi, et al., "Deposition of Electromagnetic Energy in Animals and in Models of Man with and without Grounding and Reflector Effects," Radio Science November—December 1977, pp. 39-47.*

that the enhancement by a factor of 27 is an upper limit that would not be reached.

The other condition, that of enhanced absorption in (close proximity to a flat reflector, is reported to provide a 4.7—fold increase in absorption. Again, since more than 50 percent of radiated energy is already absorbed by the user, the 4.7—fold increase represents the potential for t enhanced absorption and should be viewed as an indication of what actually happens as one operates a portable phone close to reflectors. That is, of the energy which is actually radiated, and not initially absorbed by the head and brain of a user, much will be reflected by the metallic surfaces and deposited into the user's head. This certainly doesn't leave much energy to be radiated for communications purposes.

This work by Gandhi highlights consideration of yet another absorption "hot spot" mechanism. Although this is not a "hot spot" in the strict sense of others that have already been discussed, it remains a "hot spot" issue related to where a user operates the phone and how that user might move about during operation.

For example, a portable telephone user may initiate a call while standing on a city sidewalk with no reflecting surfaces nearby, in which case the absorbed radiation, although excessive and dangerous, would not be enhanced by reflecting surfaces. Then, during that phone call a truck or bus or even an automobile may drive up and stop alongside the caller, in which case the reflection mechanism occurs and the enhanced absorption takes place. More insidious is the enhancement that may occur in the presence of reflecting surfaces that cannot be seen. Examples would include the metal framing of buildings, metal office furniture, and even the reflections from steel and cast iron bathtubs.

Gandhi also states that

in view of these observations and also since the hot spots may shift rather readily upon placement of other targets in close proximity, the entire region may be considered as one that is potentially capable of creating large enhancements. Furthermore, the reflecting surfaces need neither be good conductors nor solid in construction to cause enhancements.

When these researchers note that "hot spots" may shift readily due to placement of conductive reflectors in close proximity to the entire region this paints the clear picture that as a portable telephone operator moves about, for example by moving his or her head within an automobile, the absorption "hot spots" within the head will also shift.

Gandhi's observation that it is not necessary for reflectors to be good conductors or solid surfaces to cause the enhancements is also very informative. He points out that insulating surfaces, such as, for example, glass with embedded conducting rods, can act as solid reflecting surfaces. Consider, for example metallic screening in screen windows, metallic window shades, or the thin wires in automobile windows that are used for window defogging or for automobile radio antennas. It would be a fairly safe conclusion that the cellular telephone industry has failed to warn users about the enhanced radiation absorption related to operating a portable cellular telephone: (1) while in an automobile or bus, (2) in or near metal-framed buildings, (3) in close proximity to metal window screens or metal window shades, (4) close to metallic office furniture, (5) near large metal objects, (6) while wearing metal-framed eyeglasses, or (7) near any other type of radiofrequency radiation reflecting objects.

In a 1980 report on energy absorption, researchers determined that average SAR may only be employed for plane wave exposure.[71] In the near-field absorption enhancements completely negate any meaning of the term average SAR exposure. Also, as reported earlier by others, those researchers believe that some biological effects that occur at power density levels of less than 0.5 mW/cm² can be attributed to “hot spots" which produce thermal effects in localized areas of tissue. They also explain that

> ***because of the complications associated with defining, calculating, or measuring the near-field radiation, problems that are associated with near-field irradiation of biological models have not been solved.***

Let’s rephrase that last statement. Since the problems associated with near—zone radiation exposure are difficult, they have not been solved.

R. G. Olsen and T. A. Griner[72] also provide a communication related to their earlier, 1980, research. They identify in the update communication that

> ***Results of those experiments showed a distinctive internal ‘hot spot’ of microwave absorption in the head of the model.***

---

[71] M. F. Iskander, "Irradiation of Prolate Spheroidal Models of Humans in the Near Field of a Short Electric Dipole," IEEE Transactions on Microwave Theory and Techniques MTT—28, no. 7 (July 1980)801-7.
[72] R. G. Olsen, T. A. Griner, Bioelectromagnetics 3, no. 3, 1 1982):385-90. .

The "hot spot" information was not released with the original published research.

It should be remembered that the earlier research to which this correction refers was a plane—wave (far-zone) radiofrequency radiation exposure of a homogeneous material, and yet it produced a "hot spot" within the head.

6

R. J. Spiegel[73] considered the existence of "hot spot" absorption in relation to the existence of nonuniform electric fields in the near-zone of antennas. Other researchers had already investigated and verified very large nonuniformities of the electric fields near the antennas. Spiegel reported that damaging biological effects may be observed at temperatures above 41.6°C and that the severity of effects can be expected to be greater in organs such as the brain. He stated in 1982 that

> ***there is virtually no quantitative information in regard to the heating patterns in a human subjected to near-zone antenna fields. For ethical reasons this information cannot be acquired using actual human subjects.***

Why is this report of significance? Remember that by 1982 the cellular telephone industry had developed within its research and engineering laboratories the first generation of portable telephones. At the same time, the

---

[73] *R. J. Spiegel, "The Thermal Response of a Human in the Near-Zone of a Resonant Thin-Wire Antenna," IEEE Transactions on Microwave Theory and Techniques MTT—30, no. 2 (February 1982):177-85.*

research community had warned the manufacturers that:
(1) the work related to safety had not been performed; (2) the overwhelming indications are of a hazard to nearzone exposure; (3) many types of "hot spot"—generating mechanisms compound the effects of even low-level radio-frequency radiation exposures; and (4) humans cannot be eased for the potentially deadly experiments to determine safety/hazard levels.

A short time thereafter researchers proved, once again, that focusing radiofrequency energy is effective for providing deep penetration and "hot spot" absorption.[74] The focusing effect was so pronounced that those researchers considered applications of radiofrequency energy for hyperthermia by utilizing absorption "hot spots" for tissue heating and reported that focused deep penetration depths of as much as 6 cm were obtained. The researchers pointed out that by focusing the energy into a "hot spot" the amount of power required from an energy source is reduced by a factor of more than 20. Conversely this means that an energy-radiating element, such as an antenna, can provide greatly enhanced and focused energy deposition. Because of nonuniform absorption, localized "hot spots" may arise without any significant increase of the overall temperature. Small regions of the tissue may reach damaging temperatures while the total body doesn't exhibit an increase. This supports the earlier finding that reported significant internal "hot spots" at very low radiation levels.

---

[74] *H. Ling, et al., "Frequency Optimization of Focused Microwave Hyperthermia Applicators," Proceedings of the IEEE 72 no. 2 (Februairy 1984):224-25.*

Spiegel recites some of the concerns related to localized "hot spots" that exist even when the overall temperature rise is inconsequential. They include

> ***localized temperatures above 41.6°C cause protein denaturation, increased permeability of cell membranes, or the liberation of toxins in the location where the hot-spot exists. The severity of the resultant physiologic effect produced by localized temperature increases can be expected to be worsened in critical organs, such as the brain.***[75]

Spiegel recognized the particular susceptibility for damage to the human brain and the complex functions that the brain performs and was concerned with the local "hot spot" absorption effects. He was also cognizant of the nonuniform focusing effects of near-zone exposure to radiating antennas and reported that "localized SAR distributions produced by the antennas are much different than those generated by plane-wave fields.

7

A technique commonly employed to disguise the seriousness of the nonuniform energy absorption in biological tissue is to present data in terms of average whole body terms. In that way, no issue can be raised concerning possible local high—energy density absorption. As an extension of the averaging techniques and homogeneous

[75] *R. J. Spiegel, "A Review of Numerical Models for Predicting the Energy Deposition and Resultant Thermal Response of Humans Exposed to Electromagnetic Fields," IEEE Transactions on Microwave Theory and Techniques MTT—32, no. 8 (August 1984):730-46.*

modelling, which is nonrepresentative of human structures, researchers have employed materials which represent "average tissue characteristics." That is, they take an average of the electrical properties of materials such as fat, muscle, bone, brain tissue, and skin to arrive at some agglomeration that represents nothing that can be identified as a biological tissue.

Then, using this nonrepresentative material as a ho-. mogeneous gel-like mass that is poured into a human skull, or some material that "represents" a human skull, the researchers perform their tests.

Fortunately, not all researchers employ such nonrep-resentative structures, and we have already reviewed reports related to the inaccuracies that they can produce liven more fortunately, the simplified, nonrepresentative structures do not mask the most significant absorption effects.

In a publication by I. Chatterjee, et al., they elected to utilize a nonrepresentative "tissue cocktail" mixture that Guy developed some years earlier.76 It has become known as "2/3 muscle" tissue. That is, the energy-absorbing characteristics of the material are supposed to be approximately two-thirds that of muscle. A mannequin filled with the mixture corresponding to the electrical characteristics of two-thirds muscle properties is used by those researchers to draw conclusions on absorption characteristics.

The homogeneous phantom was irradiated at 800 MHz, and the experimental measurements confirmed the existence of a "hot spot" in the temporal lobe region that

---

76 I. Chatterjee, et al., "Quantification of Electromagnetic Absorption in Humans from Body-Mounted Communication Transceivers," IEEE Transactions on Vehicular Technology VT—34, no. 2 (May 1985):55-62.

had been observed some years earlier by industry experimenters. Another energy absorption "hot spot" that those researchers found includes the region where an eye would be located, but we should keep in mind that this homogeneous single—material model has no distinct structures or humanlike organs.

In spite of the shortcomings of the model, the researchers were still reporting "hot spots" and radiation absorption in excess of 2 mW/g. Since the radiating antenna was disposed at the front of this experimental model we would anticipate that other "hot spot" generating mechanisms would come into play and cause higher absorption if the experiments were conducted with the antenna at the side of the head and behind the ear of a more representative human head structure. It may be worth noting that the form in which the "tissue cocktail" was poured was a fiberglass mannequin. Not quite the same as a subcutaneous fat layer over bone of a skull.

An unrelated series of near-zone exposure experiments using a whole-body homogeneous model yielded data showing distinct "hot spot" energy absorption.[77] Most of the energy was deposited in the part of the "body" nearest to the antenna, with near-field enhancements of from 30 to 250 being reported. It is puzzling that the researchers chose to place the radiating antenna at the back of the model—approximately at the height of the shoulder blades for a human. However, that odd placement for the antenna still yielded data showing that most of the energy is deposited in the head and neck.

---

[77] *S. S. Stuchly, et al., "Energy Deposition in a Model of Man: Frequency Effects," IEEE Transactions on Biomedical Engineering BME—33, no. 7 (July 1986):702-11.*

Even with the unrealistic placement of the radiating antenna, the researchers have found significantly enhanced energy absorption in the head of the human model. As a result of their experiments they have determined that whole-body average SAR is not a proper dosi-metric measure. In other words, they believe that it is improper to take a localized very high exposure and average it over the total body surface in an attempt to meet the IEEE/ANSI standards. They have instead acknowledged that high energy absorption in a small localized area must be treated as a completely different circumstance from plane-wave exposures.

They also point out, and their data support the position, that most of the radiofrequency energy absorption takes place within the human model at locations very close to the antenna. Again, there is nothing surprising in the findings, as they are in concert with the earlier reports of many other scientists. One revealing distinction of this data is an energy absorption "hot spot" located in the model at a position next to the antenna feed-point. Recall that others have earlier found the same type of "hot spot" and associated the increased energy deposition with higher radiation at that point on the antenna.

High SARs in such tissues as brain or other vital organs are likely to be more critical in producing biological effects which may be potentially hazardous. For antennas located close to the body, the high values of the peak SAR on the body surface, compared to the whole body average SAR, result in exceeding ANSI condition of 8 W/kg in one gram of tissue even for transmitters with relatively low RF output power.[78]

---

78 *S. S. Stuchly, et al., "Energy Deposition in a Model of Man: Frequency Effects," IEEE Transactions on Biomedical Engineering BME-33, no. 7 (July 1986):702-711.*

During 1991 P. J. Dimbylow and O. P. Gandhi calculated SARs in heterogeneous models over a frequency range covering 600 MHz to 3 GHz with a view toward focusing, resonance, and enhanced energy absorption. Their concerns Were with radiofrequency energy deposition in the human head, particularly the eyes and brain. Although a broad range of graphical data representing the results of the experiments is included, some graphical data at 800 MHz for the adult human head is notably missing. It is intriguing that a blank space exists where the data would have been placed.

From the graphical and tabular data presented, the researchers reconfirm that exposure to radiation in the 800 MHz range leads to nonuniform absorption. For a radiation source located in front of the model the researchers note energy absorption "hot spots" in the eyes and at the center of the brain in the adult human head model. At the same frequency and also for frontal exposure, a model of a smaller head representing a child yields a much higher energy absorption "hot spot" in the brain center in addition to the "hot spots" at the eyes.

For radiation exposure coming from the side of the head only the graphical depiction of the child size head is shown. That graph illustrates significant "hot spot" absorption predominantly at one side of the head and at one eye. Coincidentally, the missing graphical data corresponds to experiments performed with the radiation incident at the side of the adult head model and at 800 MHz. These data would correspond to the type of exposure and absorption we would expect from a cellular phone.

The researchers provide tabulated data for the full range of frequencies covering 600-3,000 MHz. However, the data do not document the absorption peaks but, rather, only averaged values. Some indication of the peaks may be learned by looking to the highest averages listed for each of the exposures.

Even without employing any enhancement mechanisms the researchers have shown that relatively low level radiation, at 1 mW/cm², will result in significant energy absorption levels in the human brain.

For a child's head, irradiated from the front with 800 MHz energy, a maximum average energy absorption of 1.23mW/g is listed. For frontal exposure with the adult human model at 800 MHz a maximum average energy absorption of 0.9mW/g is given. For side exposure at 800 MHz to the head of a child the maximum average absorption level is given as 0.8mW/g. Similarly for the adult model the maximum average is given as 0.6mW/g. Keep in mind that all of the "maximums" are, in fact, averaged over one gram of tissue. That is, averaged over a cube of tissue about 0.4 inches on each side. The opportunity for significantly higher energy absorption "hot spots" within such a large volume is most probable. Recall that within a 1 cm cube of tissue there are billions of molecules and bonding links, some of which may be particularly susceptible to high energy absorption.[79]

More significant than the averaging technique the researchers employ, is the fact that these calculations have been performed by simulating plane-wave exposure.

---

[79] *P. J. Dimbylow and O. P. Gandhi, "Finite-Difference Time-Domain Calculations of SAR in a Realistic Heterogeneous Model of the Head for Plane-Wave Exposure from 600 MHz to 3 GHz," Physics in Medicine and Biology 36, no. 8 (1991):1075-89.*

Recall that plane-wave radiation assumes the energy radiating element is very far from the human. The result is that the energy arrives at the human as a uniform "wave" of energy without variations in intensity. Since these researchers did not employ real exposure conditions, their results do not incorporate any of the known enhancement mechanisms.

When we relate these findings to the power density levels known to exist as a result of using portable cellular telephones, approximately 10-20mW/cm², it is evident that energy absorption levels of 10-20mW/g can be expected at some localized regions in the brain of an operator of the portable telephone. That's also without factoring in any of the absorption "hot spot" mechanisms or nonuniform radiation mechanisms. The potential for highly focused lethal levels of energy deposition is well defined—and documented earlier by Lin.

Consider now, for example, the low-level radiofrequency radiation exposures, without factoring in the effects of reflectors, head curvature, nonuniformities of absorption, nonuniformities of antenna radiation, different tissue interfaces, temperature compensation mechanisms, metal-framed eyeglasses, internal skull ridges, brain size, or any of the other enhancement mechanisms

Then begin to factor in the effect of each of the possible enhancement mechanisms that have already been identified. It doesn't take long before we're ready to conclude that even at low radiation exposure levels these I other mechanisms may provide for local "hot spots" that are truly extraordinary in magnitude and undoubtedly destructive to human tissue, in particular highly sensitive brain tissue. Recall that Lin had already reported in a separate paper a single "hot spot" formation mechanism that provides for local enhancement by a factor of

1500. What should we conclude the total enhancement factor will be when some of these other absorption enhancement mechanisms also come into play?

3
Biological Effects of Radiofrequency Energy

Some of you might plead the excuse of your ignorance, of a limited mind and a limited range. But the damned and the guiltiest among you are the men who had the capacity to know, yet chose to blank out reality, the men who were willing to sell their intelligence into cynical servitude to force: the contemptible breed of those mystics of science who profess a devotion to some sort of 'pure knowledge"— the purity consisting of their claim that such knowledge has no practical purpose on this earth—who reserve their logic for inanimate matter, but believe that the subject of dealing with men requires and deserves no rationality, who scorn money and sell their souls in exchange for a laboratory supplied by loot. And since there is no such thing as "non-practical knowledge" or any sort of "disinterested" action, since they scorn the use of their science for the purpose and profit of life, they deliver their science to the service of death . . . They, the intellects who seek escape from moral values, they are the damned on this earth, theirs is the guilt beyond forgiveness.

—A. Rand
Atlas Shrugged

1

The earliest safety standards were based on energy absorption and temperature increases within tissue.[80] The two are mentioned together because it is a natural consequence of energy absorption that there will be a temperature increase in tissue. But subsequent revisions of the standards shifted attention to consideration of behavioral effects only. The shift away from internal biological effects became even more pronounced when the guideline for determining biological effects was changed to only "observable" effects. In other words, if an exposure doesn't result in an observable reaction or malfunction of the test subject, then the exposure isn't deemed to cause a biological effect. But what of the nonobservable effects or long—term consequences? Let's review some of the research results to determine the effects not included in determinations of safe radiation exposure levels. In a restatement of absorption characteristics, which by now must seem somewhat elementary, researchers again concluded in 1984 that to achieve deeper penetration of radiofrequency energy the 750-900 MHz range is better than 2450 MHz.[81] Particularly, it is known that radiofrequency energy absorption causes deep heating in tissue, which can lead to molecular damage, cell damage, or cell death. Any discussion of radiation exposure standards points out a serious bias that has been used effectively by opponents to stricter exposure limits. Safety standards are almost exclusively based on behavioral studies

[80] *H. P. Schwan, "Nonionizing Radiation H,azards," Journal of the Franklin Institute, December 1973, pp. 485-97.*
[81] *E. Friedenthal, et al., "Hyperthermia in the Treatment of Local Recurrence of Breast Cancer," Microwave Journal, May 1984, pp. 275-82.*

of laboratory animals. Usually laboratory animals are the test subjects and are trained to perform specific tasks such as running a maze or pressing a lever for food pellets. In order to assess the effects of radiofrequency radiation exposure, trained laboratory animals are observed while being irradiated with the energy. With testing repeated at various radiation levels the researchers can determine at which exposure levels the animals begin to lose the ability to perform the trained task. That's the process.

The very same safety standard that determines safe exposure of humans to radiofrequency radiation is based on whether or not it causes a rat to take more time to run a maze or causes a duck to peck for food pellets at a slower rate.

This then brings us to consider the fundamental flaw of the entire issue. Portable cellular telephones expose users to radiofrequency radiation and energy absorption in excess of the safety limits published by the Institute of Electrical and Electronic Engineers and adopted by the American National Standards Institute. These levels have been shown to cause behavioral effects and biological damage in laboratory animals.

In addition to simple behavioral effects there are nonbehavioral effects to be considered. Is the safety of the entire portable telephone—using population to depend on whether or not laboratory rats suffer memory deficits significant enough to cause the rat to forget how to run in maze? Does this also mean that the cellular telephone industry is prepared for the human user to suffer equivalent memory degradations and loss of capabilities?

In the past scientists were less certain of the danger threshold than they are today, but they were, nonetheless, greatly concerned that exceeding the threshold would lead to irreversible biological damage and harm.

Even exposures at levels generally thought to be non-damaging result in temperature rises of some tenths of a degree Celsius within the brain of humans. And that's without enhancements or consideration of "hot spot" formation. Nonuniform electrical properties of tissue result in nonuniform absorption and heating. Such nonuniform absorption and heating can lead to areas of damage and destruction within the head and brain even when the "average" exposure would seem to be not excessive.

2

During 1948 researchers reported that electromagnetic radiation at 2,450 MHz "is highly productive in producing lenticular opacities.[82] The lenticular opacities of which the researchers were speaking are more commonly referred to as cataracts. During the experimental portion of the research it was found that exposure of the eye (in this case rabbit eyes) to radiofrequency radiation sufficient to raise the temperature in the eye to 46°C resulted in cataract formation from six to twenty-four days after exposure.

The researchers comment that in addition to the introduction of cataracts in eyes exposed to radiofrequency radiation, "microwave generators serve adequately for producing temperature increases in selected areas of the body." These same researchers reported that exposures (if rabbits' eyes at lower power density also leads to creation of cataracts.

---

[82] *A. W. Richardson, T. D. Duane, and H. M. Hines, "Experimental lienticular Opacities Produced by Microwave Irradiations," Archives of Physical Medicine, December 1948, pp. 765-69.*

In another independent study, researchers found that radiofrequency radiation exposure could result in permanent eye damage at temperatures much lower than that reported by the Richardson team. This group reported that exposure of dog eyes to microwave energy sufficient to induce a temperature rise of from 1.9 to 3.2°C also produces cataracts. Tissue necrosis (death) and disorganization of the pigment layer were also observed under microscopic examination.83

Another report, by a Johns Hopkins researcher, Henry A. Kues, also contradicts the industry position. In the Kues report morphological changes, cell destruction, and cell death comparable to that which would be expected from ultraviolet radiation are reported for exposure of rhesus monkeys to 1,250, 2,450, and 2,850 MHz radiofrequency radiation. The researchers made a point of advising that the exposure levels were too low to produce any heating in the tissue84. These results are consistent with the findings of others that identify cell and DNA damage at low exposure levels. Because of this low level radiation damage these researchers have proposed that SAR may not always be an appropriate indicator of biological effects.

The 1980 research by L. S. Taylor indicates that radiofrequency energy exposure may inactivate enzymes or proteins that are involved in the repair process to correct DNA breaks. Thus, he indicated that, in addition to the prospect of causing direct DNA damage, radiofrequency

83 L. Daily, et al., "Effects of Microwave Diathermy on the Eye,"Society Proceedings, December 1948, p. 432.
84 H. A. Kues, "The Importance of Specific Microwave Parameters for the Induction of Ocular Effects in the Non-Human Primate," 16th Annual Bioelectromagnetics Society Meeting, June 12-17, 1994, abstract book, p. 7.

energy exposure may be responsible for inhibiting inherent DNA repair processes.[85]

3

Early reports of a long-term study using laboratory rats to detect radiofrequency radiation-induced cancers became known during 1984. At the annual Bioelectromagnetic Society conference two researchers from a team at the University of Washington headed by Guy made presentations of their research that indicated an excess of malignant tumors in laboratory rats. Dr. Chang, of the National Institute of Occupational Safety and Health, and Dr. Milham, of the Washington State Department of Social and Health Services, "immediately deduced a pattern of increased malignancies in the endocrine system."[86] On the basis of the scientific presentations, conference meetings, and discussions with the researchers, Microwave News reported that,

microwaves can promote cancer, according to the first long-term study of microwave exposure ever carried out in the United States.

The research was sponsored by the U.S. Air Force and they forwarded the experimental findings to Dr. Vernal. Of the Toxic Hazards Research Unit at the University of (California at Irvine. According to Microwave News, Dr. Vcmot responded that the "finding of excess malignancies in the exposed animals is provocative."[86] The

---

[85] *L. S. Taylor, "Implantable Radiators for Cancer Therapy by Microwave Hyperthermia," Proceedings of the IEEE 68, no. 1, (January 1980):142-49.*
[86] *Microwave News 4, no. 6, (July/August 1984):1.*

research findings were not published but instead became available as a series of air force reports that were not widely distributed.

The radiofrequency energy/cancer link debate heated up even further the following year, 1985, when Szmigielski reported an epidemiological study performed with Polish military personnel. The data indicate an increased incidence of cancer by as much as 6.7 times. Szmigielski stated that

> ***I am very surprised with the results we obtained. There is an urgent need to repeat this study using another well-defined and well-controlled population.87***

Not surprising is the fact that funding for replication studies has never been provided. However, that is no more surprising than the lack of funding for follow-up of the study that reported the significant increase of malignant tumors found in laboratory animals exposed to low-level radiofrequency radiation.

Recall that the U.S. Air Force sponsored the original study and that researchers have been clamoring for replication ever since the initial findings were made known. Since the original data was released three additional malignancies have been discovered which raises the total to eighteen for exposed rats versus five for controls. But, the research study has never been replicated.

As guest editor of the March 1987 edition of the IEEE Engineering in Medicine and Biology Magazine Gandhi wrote:

---

87 "Polish Epidemiological Study Links RF/MW Exposures to Cancer," Microwave News 5, no. 2 (March 1985).

The coupling of electromagnetic radiation to the human body is quite complex, as it depends on frequency, polarization, far-field versus near-field, corporeal posture, etc. Funding for research in this area has generally been limited, which causes most of the studies to focus on acute short-term exposure levels. These studies are not relevant to an analysis of chronic low-level exposures lasting several years. Although an expanded research effort is needed, we are instead witnessing a rapid reduction in research efforts due to cutbacks in funding.

At that time the studies showing increased malignancies in laboratory animals and the data that found increased glial nodules as a result of low-level radiofrequency radiation exposure were well—known. The radiofrequency radiation exposures used for those studies were much lower than operators of today's portable cellular telephones experience.

Although never officially confirmed, there are reports in the scientific community—among the researchers-that the air force did replicate the low-level exposure studies first performed at the University of Washington. The unconfirmed reports are that the results were identical to what the university researchers found, that is, a dramatic increase in malignant disease due to low-level radiofrequency radiation exposure. If the reports of the secret research are true, it only confirms the findings of Guy and his team.

If the secret replication studies were never performed, it leaves the obvious question—how and why could such significant findings be cast inside by the government without replication studies?

4

In a 1985 survey of the literature, researchers R. S. Lin, et al., reported that a "greater—than-expected" incidence of gliomas and astrocytomas is related to occupations connected with exposure to radiofrequency electromagnetic fields. They also report that animal studies have shown proliferation of microglia in the brain following exposure to radiofrequency electromagnetic fields. The presence of microglia is a strong indicator of earlier tissue damage and a subsequent repair process. The cited study, that by Y. A. Kholodov (1966), predates the experiments Guy performed that yielded the glial nodules in the brains of his test subjects.88

Some researchers funded by industry or the military, faced with the prospect of releasing undesirable experimental findings, will employ a broad range of "devices" to put a favorable "spin" on the results and change the perspective of those findings. In a restatement of the effects to rats chronically exposed to low—level radiofrequency radiation some researchers seem to refute their own findings of a statistically significant increase of tumors in laboratory animals exposed to low-level electromagnetic energy. The report is an attempt to claim an effect in the unexposed control group by using the experimental group as a basis.

In that article the researchers describe the long-term U.S. Air Force—sponsored study performed by A. W. Guy, et al., over a three-year period.

It compared 100 rats that were irradiated for most of their lives with 100 rats that were not exposed to

---

88 R.S. Lin, et al., "Occupational Exposure to Electromagnetic Fields and the Occurance of Brain Tumors," Journal of Occupational Medicine 27, no. 6 (June 1985):413-19.

radiation but were otherwise treated identically 89

Thus Guy has described the environment: 100 control group rats and 100 radiation exposed rats, all of which lived in identical environments.

After the experiments were completed, the researchers reported that eighteen malignant tumors developed in the exposed rats as compared to five in the control group rats. Such a difference the researchers claim is "statistically highly significant." They also state that

at face value this last finding suggests that low levels of microwave radiation can cause cancer in mice (and by inference to humans) . . . (see footnote 89).

The initial research findings were made known substantially as stated earlier. However, sometime later the researchers "reconsidered" their results and reversed their opinions.

The "politically correct" position is restated in the *Scientific American* article as:

For one thing, the total number of malignant tumors in the control animals was lower than the number expected for the particular strain of rat; the rate of malignancies in the exposed rats was about as expected . . . (see footnote 89).

Now let's review this data. All of the laboratory rats lived their lives in the same environment. Would we not expected that the entire group of 200 rats exhibit some similar level of tumor formation but not necessarily the same

---

89 *K. R. Foster, and A. W. & Guy, "The Microwave Problem," Scientific American 255, no. 3 (September 1986):32-39.*

as that of the worldwide universe of rats? Would we not expect the level of tumor formation to be the same between two groups, say 100 rats in each group? And would we not also expect the ratio of tumor formation between one of those groups and the outside universe to be the same as for the other group and the outside universe?

That is not to say that the rate of tumor formation for the two groups of 100 rats will be the same as the rest of the universal population of the same type of rats. It simply means that the two groups of laboratory rats should show the same rate of tumor formation independent of the outside world.

Laboratory practice, health care, feeding, and other environmental factors will determine whether or not any isolated group of laboratory rats will develop malignant tumors at a rate identical with, exceeding, or, as in this case, less than the average for the overall rat population. That is exactly the purpose of maintaining a control group for such experiments.

With a control group to which the exposed group can be compared, only the experimental variable need be considered as providing the stimulus for any significant research results. These researchers found extraordinary results. They found entirely unexpected results. They found results that the business community, in concert with the U.S. military, could not accept. The researchers initially published those research findings as what the findings represented: evidence of cancer formation in rats that had been exposed to low-level radiofrequency radiation. Interestingly, since the initial findings were published and since the time of the restatement of those? findings, the principal researcher of that team has received very little research funding from the sources that had funded him generously earlier.

S. S. Stuchly has reported that .

> ***high SARs in such tissues as brain or other vital organs are likely to be more critical in producing biological effects which may be potentially hazardous.***[90]

while M. A. Stuchly provided interesting insight into the thinking of some researchers with her review of Canadian protection guides. With respect to "hot spots" and near-zone exposures she wrote:

> ***One of the most important findings is that the SAR distributions are highly nonuniform, with typical ratios between spatial peak and whole-body average SA Rs of the order of 150:1 to 200:1. Even cursory consideration of physiology would suggest that high SARs in such tissues as brain or other vital organs are likely to be more critical in producing biological effects which may be potentially hazardous.***[91]

In her review she also noted the U.S. EPA stated that “the data currently available on the relationship of SAR to biological effects show evidence for biological effects at in SAR of about 1 W/kg.” That is 1mW/g.

---

[90] *S. Stuchly, et al., “Energy Deposition in a Model of Man: Frequency Effects," IEEE Transactions on Biomedical Engineering BME-33 7 (July 1986)702—11.*

[91] *M. A. Stuchly, Canadian and Other National RF Protection Guides, Electromagnetic Interaction with Biological Systems, ed. J. C. Lin (New York; Plenum, 1989) PP. 257-70.*

6

In 1990, S. F. Cleary[92] provided one of the first advances in the study of cell-level bioeffects with a research report that indicates glial tissue, such as that which is found in the supporting structure of the brain, may be induced to increase in proliferation rate due to exposure to electromagnetic energy. This is in addition to any restoration processes that may occur subsequent to a damaging thermal insult from high-level electromagnetic energy exposure. Also significant is that the increased cell proliferation persists after the radiation stimulus is removed.

Cleary tells us:

> ***Persistent indications that the mammalian central nervous system is perhaps the most sensitive tissue for RF-induced alterations has provided the rationale for in vitro studies of effects on brain tissue and brain and neural cells. Not surprisingly, in vitro brain cell sensitivities to RF exposure are among the highest reported.[93]***

At the same time, the U.S. Environmental Protection Agency released a draft copy of its report on the evaluation of the potential carcinogenicity of electromagnetic fields. The report, first of all, finds that

---

[92] S. F. Cleary, et al., "Glioma Proliferation Modulated in Vitro by Isothermal Radiofrequency Radiation Exposure," Radiation Research 121, (1990) pp. 38-45.

[93] S. F. Cleary, Biological Effects and Medical Applications of Electromagnetic Energy, ed. O. P. Gandhi (1990), p. 348.

In view of these laboratory studies, there is reason to believe that the findings of carcinogenicity in humans are biologically plausible.[94]

Of course, they were referring to laboratory studies that they had reviewed. This admission by the EPA means that the carcinogenic effects of electromagnetic energy are valid or likely.

The report continues with a reasonable clarification about the energy stored in the near-zone of transmitting antennas:

A dielectric or conductive object placed in the field will absorb more power (energy/time) than is predicted to be incident on the object by the power density calculation.

As has been described, some stored energy is also absorbed into the head and brain of a portable phone user. Industry researchers and spokesmen often claim that the stored energy collapses back into the antenna and is restored twice each cycle. That physical action has already been addressed with the explanation of how the energy is stored in the fields around the antenna and how some of that energy is drawn into the head of a nearby operator. The EPA, confirmed exactly the same phenomenon by reporting:

In such cases, the object is absorbing stored energy from the electric field as the movement of charged particles or polarization of the dielectric produces thermal motion . . . (see footnote 94).

---

94 *U.S. Environmental Protection Agency, Office of Research and Development, EPA 600 6-90 005B, October 1990.*

The EPA researchers were describing an actual physical mechanism that takes place in the biological tissue when A radiofrequency energy is absorbed. That is, it is converted into heat by causing molecules, electrons, and ions in the tissue to move. For an operator of a portable cellular telephone much of that motion is within the brain. The operator's brain cells are excited into motion to change the radiofrequency energy into heat energy.
The EPA continues:

> ***The body may be thought of as an antenna that absorbs energy from the field . . . (see footnote 94).***

Although the analogy is somewhat removed from what is actually happening, it does point out that the EPA acknowledges that both radiated and stored energy are absorbed by biological tissue in close proximity to a radiation source.

On a smaller scale, the EPA acknowledges that microscopic interactions occur at the level of individual cells and at cell membranes and are observed to have effects on the motion of ions.

Although the precise mechanism of interaction that leads to adverse biological effects, such as cancer, was not yet known in 1990, some of the possibilities the EPA has listed include electrical current in the body and electromagnetic fields in "critical organs such as the brain." A comment related to the lack of knowledge of the specific damaging mechanism clarifies that the EPA is also lost in the investigation for a single specific causal connection. It would seem to be a questionable approach when dealing with a technology that has been shown over a period of thirty or more years to be harmful if applied improperly.

The position of the EPA is wholly inappropriate. There is ample evidence that exposure to excessive levels of radiofrequency radiation will cause permanent damaging effects to humans. There is also wel1—documented research evidence that operation of portable cellular telephones exposes humans to those excessive levels.

But instead of withholding the portables from the market until the devices can comply with existing safe exposure limits, the manufacturers are demanding proof of a specific interaction mechanism that connects low-level radiation exposure to cancer. The two issues are entirely separate. However, government agencies, in convert with the cellular telephone industry, are using the low—level exposure issue to avoid any action on the immediate, verified excessive exposure problem.

Some of the cited research studies have identified that electricians, engineers, and technicians had an increased incidence of brain tumors. We are expected to conclude that those individuals, more likely to be exposed to electromagnetic energy, developed the cancers because of the electromagnetic energy exposure. The real world is much different today than it was when those study subjects died. Today virtually every person becomes a candidate for dangerous radiofrequency energy exposure just by picking up and operating a portable cellular telephone. Just as the excess brain cancers were associated with certain professions prior to 1980, future excess brain cancers will be tied to the general population of cell phone users after the 1990s.

The EPA has concluded that

the results of the occupational cancer studies are remarkably consistent .... [T]he consistency and

specificity of the findings provide evidence that EM- field exposure in the workplace may pose a carcinogenic risk for adults . . ." (see footnote 94).

Radiofrequency energy exposure has moved into the everyday environment for most people. What was true for the relatively few individuals in the past is now, by the EPA's own conclusions, the norm for the entire population.

In summary form, the EPA's report of five case control studies found that

four of the jive noted significantly elevated risks of cancer in the following categories of employment; (1) gliomas and astrocytomas in Maryland electricians, telephone servicemen, linemen, railroad and telecommunication workers, engineers as well as electronic engineers; (2) primary brain cancer in workers of Philadelphia, northern New Jersey, and south Louisiana involved with design, manufacture, repair, or installation of electrical and electronic equipment; (3) brain cancer in East Texas male workers involved in highly exposed (EM fields) occupations in the transportation, communication, and the utilities industry; (4) brain cancer in workers identified in a 16-state NCHS survey of industries and occupations" (see footnote 94).

One common thread that runs through these four case studies is brain cancer. Realize now that the levels of electromagnetic energy to which those workers were typically exposed were much lower than the exposure to which a portable cellular telephone user is subjected with each telephone call.

The EPA, in this report, concedes that "There is a link between exposure to EM fields and certain forms of

site-specific cancer, namely leukemia, CNS, and lymphoma" (see footnote 94). Of course, in the instances when the exposure is directed at the head and brain of the human subject, as it is with portable cellular telephone use, we should expect that the predominant form of cancer would be central nervous system (brain) cancer.

7

Prior to 1992, Dr. Vera Garaj-Vrhovac investigated effects of radiofrequency energy and found chromosomal abnormalities among workers exposed to radar radiation. During the epidemiological study the health of 40 workers was monitored. From this study the researchers coneluded that “microwave radiation can induce damage in the structure of chromosomal DNA."[95] When six of the men under study were inadvertently exposed to a high level of radiofrequency radiation they were examined for resultant effects. High levels of chromosomal alterations were found. However, that was not the only evidence that came from the study. Lens opacities, cataracts, were also found among the exposed workers.

Those men were working while being exposed to levels of radiation, typically less than 5mW/cm2, generally thought to be too low to induce any behavioral, biological, or thermal effects. The cellular telephone industry’s scientific researchers have continued to hold fast to the belief that radiofrequency radiation cannot modify chromosomal structure or DNA. Their argument is based on a misapplication of some physical principles while ignoring

---

95 *"Human and Cellular Studies Point to Similar Mutagenic Effects to Radar," Microwave News 12, no. 3, May—June 1992.*

the actual physical principles that should be used. The result is a financially motivated debate about the possible interaction mechanisms that cause the chromosomal or DNA damage.

8

Recall the long-term radiofrequency radiation exposures using laboratory rats as the test subjects. The low-level exposures produced a significant increase in the number of malignant tumors that developed in the rats. The researchers reported those findings but later retracted the conclusions and, instead, claimed that the dramatic increase in cancers in the laboratory animals was meaningless. The reason given was that all of the cancers were not the same type. That is, they were proposing that the test data showing a nearly fourfold increase in cancers (primary tumors) among animals exposed to low-level radiofrequency radiation shouldn't be used because the cancers were not all identical.

In 1992 C. K. Chou, et al., provided an "official" re-interpretation of the test data. They wrote at that time:

> ***The finding of a near fourfold increase of primary malignancies in the exposed animals is provocative. These data cannot be considered as an artifact because different statistical analyses led to similar results.96***

Let's review some of the findings from the original study:

---

96 C. K. Chou, et al., "Long-Term, Low-Level Microwave Irradiation of Rats," Bioelectromagnetics 13, no. 6, pp. 469-96.

· The exposed group developed three cortical carcinomas -- the control group developed zero.
· The exposed group developed seven pheochromocytomas -- the control group developed one.
· The exposed group developed two cases of liver adenoma -- the control group developed zero.
· The exposed group developed two cases of thyroid carcinoma C-cell -- the control group developed zero.

In all, the search identified more than eighty different types of tumors. Of these, the four types of cancers identified here are remarkable in that the incidence in the exposed group varies significantly from the control group. These tumors were located in the adrenal glands, liver,·thyroid, and pituitary glands of the exposed rats.

Consider now the logic of the unfounded doctrine the IGPA has attempted to espouse in support of the "corrected" conclusions to the Guy, et al., research. We know full well that X-ray radiation exposure can lead to a variety of cancers, including leukemia, bone cancer, thyroid cancer, lung cancer, brain cancer, skin cancer, and more. The list goes on to include virtually every organ and area of the body, whether human, primate, or laboratory rat. If`, as the EPA proclaimed in 1986, evidence of carcinogenicity must be confined to a specific tumor type, then, according to the EPA, X-ray radiation should not be considered as a cancer-causing agent. Of course, this is ridiculous. Just as ridiculous is the EPA posture with respect to the powerful and compelling RF energy research data. A significant indicator related to the long-term exposure is the time during the life cycle of the rat when the primary tumors were found. For both the exposed and control group, no primary malignancies were found up to the time the test animals were eighteen months old.

However, a dramatic difference occurred in the age group of nineteen-to-twenty-four-month-old laboratory rats. In that age group, nine of the exposed animals developed malignant tumors while only one of the control group developed a malignant tumor. Similarly, in the twenty-five to-thirty-month-old rats seven exposed group malignancies were found versus two in the control group. In all, during the last twelve months of the program sixteen malignancies were found in the exposed group, compared to only three in the control group. That's more than a fivefold difference.

The purpose of the experiment was to identify long-term effects of exposure to low-level radiofrequency radiation. A very dramatic long-term effect was found, reported, and suppressed.

If a reasonable argument were to be placed before the research community it would take the form entirely different from the tangential one that has been waged from 1983 to the present. The real argument to be made is how much greater the cancer incidence will be when laboratory animals are exposed to the same power density levels that humans experience every day by operating portable cellular telephones.

Research work that complements that of Guy was presented by L. Andriyenko and A. Serdyuk. They documented an increased incidence of malignant tumors in the large intestines of rats as a result of exposure to pulsed electromagnetic radiation (0.1-2.5 mW/cm²). The experiments were performed at power density levels lower than typical for cellular telephone exposures. Yet the increase in tumor formation was observed.[97]

---

[97] *L. Andriyenko, and A. Serdyuk, "Effect of Extremely-High Frequency Pulsed EMF on White Rats' Organism and Antenatal Hereditary Development," 2d Congress of The European*

An instance of personal injury relates to the earlier research findings that metal objects within biological tissue can alter electric fields in a way that increases the field strength or results in sufficient heat to cause tissue destruction resulting in lesions.

A World War II radar specialist was periodically exposed, over a three-year period, to radiofrequency radiation at a power density of about 32mW/cm². Because of a metal implant in the right side of his mouth the radiation caused heating, which he claims damaged the facial nerve tissue. He experienced severe swelling and numbness after one particular exposure during 1944. The swelling eventually subsided, but the numbness was permanent. Medical examination indicated that demyelination, today associated with excessive radiofrequency radiation exposure, had occurred similar to a diathermy injury or X-ray exposure injury. At the time he told his doctors of the radiation exposure, but his doctors were ignorant of radiofrequency energy effects.[98]

Had this man or his doctors known of the existing research evidence which clearly demonstrated the effects of metal implants in concert with radiofrequency energy, he may have been able to obtain medical benefits for his injuries. Instead the Veterans Administration has denied this man benefits even though solid scientific research supports his account of how the injury occurred.

Bioelectromagnetics Association, December 9-11, 1993, conference abstracts, pp. 20-21.

[98] "Radar and Nerve Damage; A WWII Veteran's Case Report, "Microwave News 12, no. 5, (Sepember/October 1992).

10

It was late in 1993 that A. Maes, et al., succeeded in having their research related to chromosomal aberrations published. The experiments, performed during mid-1992, involved assessment of the effects of non-thermal (low-level) radiofrequency radiation exposure to human blood lymphocytes. Their findings indicated "a marked increase in the frequency of chromosome aberrations....and micronuclei.[99] The experimental data shows increased chromosomal damages as a function of exposure time. The researchers found that the aberrations were characteristic of what would be expected from exposure to ionizing radiation, such as X rays. The micronuclei, which they found, are the result of cell divisions that include a parent cell that had a damaged nucleus or from which incomplete cell replication took place. They wrote:

> ***It may be stressed that chromosome aberrations in exposed cells included a number of dicentric chromosomes that may be considered hallmarks of ionizing radiation exposure.***

They seemed to anticipate a hostile reception, or had already been subjected to disagreement about their findings and as if in response to some unmentioned argument wrote that

> ***Taking into account that the microwave energy (as that of other non-ionizing electromagnetic fields) is***

---

[99] *A. Maes, et al., in "Vitro Cytogenetic Effects of 2450 MHz Waves on Human Peripheral Blood Lymphocytes," Bioelectromagnetics 14, no. 6 (1993): pp. 495-501.*

far too low to break chemical bonds it may be considered surprising to find chromosomal breaks and micronuclei, which also originate from breaks or chromosome lagging, following microwave exposure.

Of course, the belief that microwaves cannot cause bond breaking in chromosomes or DNA or damage tissue more generally is quite inaccurate. Since the energy absorption mechanism is not the same as that for ionizing radiation, such as X rays, the mechanisms of energy transfer that cause the bond breaking may be different. However, the result is quite evident—DNA and chromosomal damage.

Other researchers have documented evidence that human and rat whole blood samples exposed to 450 and 954 MHz radiofrequency radiation provided RF radiation induced DNA breaks.[100] The cellular industry has insisted for nearly fifteen years that no such effect could be obtained from radiofrequency energy. This research, by L. Verschaeve, is but one of many similar reports that became known during 1994 and supports the earlier findings by S. F. Cleary. M.

For example, Cleary has, for some years, maintained that exposure of brain cells to radiofrequency radiation will result in increased proliferation of the cells. The cellular industry has refused to accept Cleary's findings on the grounds that they have not been replicated at other laboratories. However, the industry has not funded independent researchers to make the attempt. Cleary, et al., reported their own replication and confirmation of the

---

[100] *L. Verschaeve, et al., "Genetic Effects Associated with Microwaves from Mobile Telephone Frequencies," 16th Annual Bioelectromagnetics Society Meeting, June 12-17, 1994, abstract book, p. 5.*

earlier research.[101] The experimental results indicate an increase in cell proliferation when exposed to RF radiation of 2,450 MHz at 25 mW/g SAR.

In still another presentation related to modifications to tissue, S. Chegrinets and A. Gotz reported that pulsed 150-300 MHz electromagnetic radiation at 5.0 mW/cm² causes chromosomal changes in human peripheral lymphocytes and whole blood cells.[102] The significance of the work becomes evident when we consider that researchers are finding these same results all across the radiofrequency portion of the spectrum. It's not just happening at one frequency, and it's not just being observed by researchers in one laboratory. The same chromosome and DNA damages are being reported at frequencies across the entire range, including 100 MHz, 300 MHz, 837 MHz, 954 MHz, 1,250 MHz, 2,450 MHz, and up to 9,000 MHz.

In a more alarming report C. Cain, et al., disclosed that 837 MHz radiation at a power density exposure level of 3.7 mW/cm² produced a 40 percent increase in what the researchers refer to as "focus formation." To these researchers the results indicate that the radiofrequency radiation was acting as a copromoter for cancer formation. This team is part of the same Loma Linda, California, research group that also reported increased cell proliferation. The data coming from this laboratory seem all to be indicating the same conclusion—radiofrequency

---

[101] *S. F. Cleary, et al., "Effect of Isothermal RF Radiation on Cytotoxic T-Lymphocytes," 16th Annual Bioelectromagnetics Society Meeting, June 12-17, 1994, abstract book, p. 5.*

[102] *S. Chegrinets and A. Gotz, "Cytogenetic Effects of , Pulsing 150-300 MHz Electromagnetic Field on Human Lymphocytes In Vitro," 2d Congress of the European Bioelectromagnetics Association, December 9-11, 1993, conference abstracts, pp. 22-23.*

energy emitted from portable cellular telephones causes brain cell modifications.[103]

In the past the cellular industry has been funding the Loma Linda group quite heavily to conduct the research. It would seem probable that on the basis of their own funded research the industry would take some precautionary action to prevent or mitigate the damage to present and future users of these products. Instead the industry continues to respond with the defense that *"there is no proof." The entire worldwide research community is laying the results on the table piece by piece to complete the puzzle. Yet the industry interests refuse to be moved.

11

At the European Bioelectromagnetics Association 2nd Congress, Kuster provided computational and experimental data indicating excessive energy absorption in the heads and brains of operators of portable cellular telephones. SARs of 4.3 mW/g and as much as 8 mW/g were reported in that presentation. These levels by far exceed the recommended maximum exposure of the ANSI standard and are high enough to result in significant temperature increases within the brain. Those research findings seemed to stir the research community into an active mode, which became evident at the Bioelectromagnetics Society meeting the following summer. At that subsequent meeting many researchers reported experimental

---

[103] C. D. Cain, et al., "837 MHz Digitial Cellular Telephone RF Fields and Copromotion of Focus-Formation, In Vitro," 16th Annual Bioelectromagnetics Society Meeting, June 12-17, 1994, abstract book, p. 69.

results much the same as Kuster reported at the earlier conference—high levels of energy absorption by the phone users.

At the same time, and quite independently, other researchers are reporting the findings of chromosome damage and DNA modifications resulting from radiofrequency radiation levels many times lower.

Also at that earlier European conference, S. Kwee and P. Raskmark reported that a thirty—minute exposure to 50 Hz fields resulted in distinct increases in both cell growth and DNA replication.[104] This report was a prelude to the more definitive DNA effects that were reported throughout 1994 and ties in with the work being performed by the Adey team—that is, research on effects induced by low-frequency modulation of radiofrequency radiation.

12

Looking again to low-level exposure, H. Lai, et al., presented a report that indicates low-level (0.6 mW/g SAR) radiofrequency radiation exposure at 2,450 MHz results in memory deficits for experiments conducted with rats.[105] This was a follow-up presentation to an article by H. Lai, A. Horita and A. W. Guy published only a few

---

[104] *S. Kwee and P. Raskmark, "Changes in Cell Proliferation Due to Environmental Electromagnetic Fields," 2d Congress of the European Bioelectromagnetics Association, December 9-11, 1993, conference abstracts, p. 10.*

[105] *H. Lai, et al., "Microinjection _of an Opioid Antagonist into the Septum Blocked Microwave-Induced Decrease in Hippocampal Cholinergic Activity in the Rat," 16th Annual Bioelectromagnetics Society Meeting, June 12-17, 1994, abstract book, p. 5.*

months earlier that provided substantially the same information. The memory deficits were observed as an inability of the rats to perform in a maze experiment. In effect the rats forgot their way around a familiar area.

The researchers explain the effect as being caused by a decrease in brain activity.[106] The low-level radiation exposure is extremely significant. Virtually all operators of portable cellular phones subject themselves to such exposure and energy absorption while operating the phone. Further, the memory deficits do not stop when the exposure ends. Researchers have learned that the effect persists for five days or more.

In another research presentation directly related to the memory deficits and motor control deficit issue, G. Thuroczy, et al., have shown that modifications to EEG are a result of exposure to 2,450 MHz pulsed radiation at 3 mW/cm².[107]

A. Smolia has also performed and reported experiments using laboratory rats exposed to low level pulsed radiofrequency radiation at power densities of from 0.5 to 1.5 mW/cm².[108] That's about ten times lower than the typical exposure from a portable cellular telephone. During and after radiation exposure the test animals exhibited EEGs that show complex functional changes. The changes were dependent on the level and duration of the

---

[106] *H. Lai, A. Horita, and A. W. Guy, "Microwave Irradiation Affects Radial-Arm Maze Performance in the Rat," Bioelectromagnetics 15, no. 2 (1994):95-104.*

[107] *G. Thuroczy, et al., "Acute Changes in Brain Electrical Activity (EEG) after GSM Modulated Microwave Exposure on Rats," 16th Annual Bioelectromagnetics Society Meeting, June 12-17, 1994, abstract book, p. 57.*

[108] *A. Smolia, "The Dynamic of EEG Spectral Density in Rats Exposed to 10cm Pulsed Microwaves," 16th Annual Bioelectromagnetics Society Meeting, June 12-17, 1994, abstract book, p. 8.*

exposure and persisted for quite some time after the exposure was stopped. The researcher concluded that the EEG modifications are a result of exposure to the radiofrequency radiation.

Other researchers found, and reported that exposure of unanesthetized rabbits to 800 MHz radiation at 40 mW/cm² for twenty seconds also results in changes in the electrical activity of the brain (EEG).[109]

Yet another report of EEG modifications was presented by L. von Klitzing. He found that humans exposed to low-levels of pulsed RF radiation at less than 1.0 uW/cm², exhibit altered EEG signals. That level is about 10,000 times lower than the radiation level to which users of portable cellular telephones are exposed. Further, this research reports that the alterations persist for up to a week after exposure.“[110] That is, after the last exposure has ended the EEG modifications in one’s brain will
continue to affect memory and motor skills for about a week.
If a cellular telephone operator picks up a portable and makes a call it should be with the knowledge that he will also be modifying the functioning of his brain for about the next week. Every action that occurs within that individual’s life during that next week will be affected by the EEG modifications resulting from the portable cellular telephone call.

---

[109] *R. A. Chizhenkova and A. A. Safroshkina, "Electrical Reactions of Brain to Microwave Irradiation," 2d Congress of the European Bioelectromagnetics Association, December 9-11, 1993, conference abstracts, p. 23.*

[110] *L. von Klitzing, "What May Be the Biological Relevance of Altered EEG-Signals in Man Induced by Pulsed EM-Fields‘?" 16th Annual Bioelectromagnetics Society Meeting, June 12-17, 1994, abstract book, p. 70.*

13

Early in 1994 research performed in India by S. Sarkar, S. Ali, and J. Behari[111] confirmed that DNA modifications result from low-level exposure to radiofrequency radiation. The conclusions brought forward from that research included a call for a reevaluation of the belief that radio-frequency radiation could not cause cancer. Clearly, if radiofrequency radiation can rearrange the DNA in tissue then it can initiate cancer. These findings should have also prompted the U.S. Environmental Protection Agency to reopen its investigation related to the cancer causing effects of radiofrequency energy exposure.

In the EPA's draft report, "Evaluation of the Potential Carcinogenicity of Electromagnetic Fields" they concluded that radiofrequency energy was not capable of causing DNA damage. That conclusion was simply a restatement of the unscientific hopes and wishes of the telecommunication industry. On that basis, they determined that there was no direct link to classify radiofrequency energy as a direct carcinogen even though other exposures did indicate a definite relation to cancer. With the recent revelations of DNA damage tied to radiofrequency radiation, the EPA's argument simply evaporates.

It almost seems as if the EPA's position, regarding a lack of evidence related to DNA damage, has been taken as a challenge among researchers. It is only a few years since the EPA's review of the research base claimed to find no conclusive evidence to support the DNA damage theory; now the research data are coming from independent researchers located at laboratories around the world.

---

[111] *S. Sarkar, S. Ali, J. Behari, "Effect of Low Power Microwave on the Mouse Genome: A Direct DNA Analysis," Mutation Research 320 (1994):141-47.*

Late in 1994 H. Lai and N. P. Singh made known the results of their research that should have been received by the cellular telephone industry as the conclusive proof it claims to be seeking. This was yet another study of the effects of low-level radiofrequency radiation to DNA and was performed with live laboratory anima1s.[112] Their findings provided a significant confirmation of the previous studies out of India, Belgium, and Kiev. Low-level radiofrequency radiation exposure causes DNA modification. Dr. Lai summed up the findings by stating:

DNA damage is related to the initiation of cancer- if there is an error in the repair process, it could lead to a problem.[113]

The problem Lai suggests is cancer.

Lai and Singh repeated the experiments and in 1996 reported again that low-level exposure to radiofrequency radiation causes an increase in single- and double-strand breaks in DNA.[114]

And as recently as 1997 M. H. Repacholi, A. Basten, V. Gebski, D. Noonan, J. Finnie, and A. W. Harris published research results that demonstrate that mice exposed to low levels of 900 MHz RF radiation exhibited a higher incidence of cancers than did their nonexposed laboratory counterparts. In this study the exposed mice

---

[112] *H. Lai and N. P. Singh, Acute Low-Intensity Microwave Exposure Increases DNA Single-Strand Breaks in Rat Brain Cells, in press.*
[113] *"Microwaves Break DNA in Brain; Cellular Phone Industry Skeptical," Microwave News 14, no. 6 (November/December 1994).*
[114] *H. Lai and N. P. Singh, International Journal of Rad. Biology 69 (1996):513-21.*

suffered a greater than twofold increase in the occurance of lymphomas.[115]

These findings were further evidence implicating RF radiation with cancer causation, as have been additional follow —up findings by Lai and Singh which suggest a possible mechanism by which the radiation causes DNA damage. These researchers conclude that

Data from the present experiment confirm our previous finding that acute RFR exposure causes an increase in DNA single-and double-strand breaks in brain cells of the rat.[116]

14

Many years earlier H. P. Schwan reminded us that the Western standards are based solely on behavioral effects.[117] He observed that some considerations for establishing safety standards are based on economics over safety. In his example, Dr. Schwan points out that a safety standard of 10 mW/cm² would burden the broadcast industry (TV and radio stations) since the field intensities around many antenna sites provide power densities higher than that limit.

---

[115] M. H. Repacholi, A. Basten, V. Gebski, D. Noonan, J. Finnie, and A. W. Harris, "Lymphomas in Eu-Pim1 Transgenic Mice Exposed to Pulsed 900 MHz Electromagnetic Fields," Radiation Research 147 (1997):631-40.
[116] H. Lai and N. P. Singh, "Melatonin and a Spin-Trap Compound Block Radiofrequency Electromagnetic Radiation Induced DNA Strand Breaks in Rat Brain Cells," Bioelectromagnetics 18, no. 6 (1997):446-54.
[117] H. P. Schwan, "Nonionizing Radiation Hazards," Journal of the Franklin Institute, December 1973, pp. 485-97.

Further, he mentions that some sections of our largo cities would need to be evacuated unless radiation from the broadcast antennas was reduced. How is it that tho various industries can justify such exposure levels? For one they point to therapeutic applications of radiofrequency energy. Industry spokesmen would like us to accept that since higher levels of radiofrequency energy are used for medical applications such exposures must be suitable for the general population.

But should the general population moving about the cities and countryside be bombarded by therapeutic doses of radiation? Should the general population, going about its everyday business, be subjected to doses of radiation that effectively raise the internal temperature of parts of their bodies and result in biological modifications?

15

J . A. D'Andrea performed experiments with laboratory rats to determine at what power densities behavioral effects could be observed.[118] The rats were trained to press a lever for food and the effects of radiofrequency radiation were determined by observing variations in the performance of the rats. Behavioral effects were observed in the test subjects for exposure to 600 MHz radiation and at a power density of 7 .5mW/cm². The behavioral effects were documented as work stoppage. More accurately, the rats stopped working for food. At higher power levels, 20mW/cm², the rats stopped the activity sooner.

---

[118] *J. A. D'Andrea and O. P. Gandhi, "Behavioral and Thermal Effects of Microwave Radiation at Resonant and Nonresonant Wavelengths," Radio Science, November—December 1977, pp. 251-56.*

It should be noted that the researchers did not consider a behavioral effect—work stoppage-—until the rate of work dropped to 33 percent of the average the rats were trained to perform. Clearly, something was happening to the rats much sooner than the "threshold" point that, was defined as an "effect."

Consider such a gross change if it were to take place with human performance. For example, a brick mason may lay about 900 bricks during a full day of work. According to the guidelines defined previously for behavioral change, the bricklayer would only be classified as exhibiting a behavioral effect when his production fell to 300 bricks a day. We can all be fairly confident that by then he'd already be looking for a new job, or he'd be out of business if he were a private contractor.

Consider further how the same effects in laboratory animals would be expected to show up in human activity. Consider athletes as a next example. Most professional athletes are specialists within the overall game. Football has its premier receivers, and basketball has its all star shooters. Baseball is known for its Golden Glove fielders and excellent hitters. But what might we find when any of these specialists is impeded, as were the laboratory animals in the previous experiment? How about unexplainable fumbles, poor shooting percentage, fielding errors, and low batting average, which appear from one season to another or seemingly overnight and persist without apparent cause?

Aside from the curious way of defining when an effect was present or absent the researchers have provided valuable information. Since the exposure levels from portable cellular telephones may exceed 7.5mW/cm² it should be apparent that radiation absorption in some areas of the human head is at least as high as that which causes

laboratory animals to cease an activity that provides them with food.

Some years later, during 1986, these same researchers performed a long-term radiation exposure experiment during which rats were irradiatied with low-level radio-frequency radiation. During and after the exposure the rats were tested and evaluated to determine the presence of any physiological and behavioral effects. The results showed that the radiation exposed rats suffered from aloss of ability to perform tasks for which they were previously trained. The researchers felt that the performance deficiencies of the rats were not significant enough to form a definite conclusion. Therefore, they reran the experiment at a higher radiation exposure level.[119] That is, even though there was some deficiency in the performance of the rats, the researchers decided not to state an effect at the original exposure level. They chose to repeat the experiment at a higher exposure level.

This second report by D'Andrea, et al., included similar experiments during which rats were exposed to radiofrequency radiation for fourteen weeks. The researchers found that

> ***significant differences between the two groups were also observed when the rats were tested after the 14 weeks of intermittent microwave exposure.***

The two groups to which they refer are the exposed and control groups. The differences, once again, are a diminished capability to perform tasks for which the rats had been previously trained. In the instance of this second

---

[119] J. A. D'Andrea, et al., "Behavioral and Physiological Effects of Chronic 2,450-MHz Microwave Irradiation of the Rat at 0.5mW/cm²,". Bioelectromagnetics 7, no. 3 (1986):45-56.

experiment the researchers point out that the effects remained even thirty days after the exposures were ended.
They comment:

This decrement in performance of the schedule-com trolled behavior becomes more prominent as the dose-rate is increased from 0.5 to 2.5 mW/cm².[120]

Research into the physiological and behavioral aspects continued, during 1988, with additional evidence that exposure to radiofrequency radiation results in memory deficits and motor skill loss. C. L. Mitchell, et al., found that rats exposed to radiation at a power density of 10mW/cm² suffered from degradations in "locomotor" capability. This decreased motor activity was also accompanied by a decrease in "startle response."[121] In other words, the test subjects were not alert to danger in addition to suffering the reduction in motor skills. These findings are consistent with earlier research results that also indicated loss of motor skills as a result of exposure to radiofrequency radiation.

The memory deficits that have been observed in the laboratory rats have also been indicated in humans exposed to radiofrequency radiation. One method of monitoring such effects is by use of the electroencephalogram (EEG). Changes in EEG readings that persist for days or weeks after radiation exposure has ended are indicators of long-term modification to brain activity. These modifications have been observed in the rats as an inability to

---

[120] J. A. D'Andrea, et al., "Intermittent Exposure of Rats to 2450 MHz Microwaves at 2.5mW/cm²: Behavioral and Physiological Effects," Bioelectromagnetics 7, no. 3 (1986):315-28.
[121] C. L. Mitchell, et al., "Some Behavioral Effects of Short-Term Exposure of Rats to 2.45 GHz Microwave Radiation," Bioelectromagnetics 9, no. 3 (1988):259-68.

carry out tasks for which they have been trained. In humans such EEG brain activity changes would be observed as diminished memory and capability to perform manual tasks that require motor skills. Some motor skill tasks include operation of an automobile and participating in skilled sports. Note that since the brain activity modifications continue for up to weeks after exposure, the corresponding deficits in operational performance will also continue.

Such mental degradations in humans are clearly a danger to those operating motor vehicles or machinery. Oftentimes it's our startle response that allows us to react to situations and avoid accidents. If a decrease or blockage of the startle response is coupled to a generalized decrease in mental activity and motor skills capability the combination points to the prospect for increased accidents and injuries.

16

In a first report on the effects of modulated radiofrequency radiation A. R. Sheppard, Bawin, and Adey confirmed that low —intensity modulated (16Hz) 450MHz fields produce modified calcium efflux through brain cell membranes. The researchers observed the effect for power density levels lower than 2.0 mW/cm² [222] Significantly, the cellular telephone system in the United States currently operating as an analog system, is in the process of changing to a digital signal system. A digital system

---

[222] *A. R. Sheppard, et al., "Models of Long-Range Order in Cerebral Macromolecules: Effects of Sub-ELF and of Modulated VHF and UHF Fields," Radio Science 14, no. 6S (November-December 1979):141-45.*

utilizes low-frequency switching, such as those that these researchers are investigating.

At the same time, it is also necessary to consider that even the analog system, although thought by some to operate at a single frequency, does in fact operate with frequency modulation. Electronic circuitry used in handheld cellular phones may also allow the transmit frequency to change over small ranges that is effectively the same as the frequency modulation used by the researchers. In effect, these research findings are relevant for both systems.

Evidence that weak modulated radiofrequency radiation causes effects at the level of individual cells is significant since it brings out another mechanism for interaction. This interaction is distinctly nonthermal in nature. It has been proposed by Adey that communication between cell occurs along pathways between the cells and that interruptions in the communications may lead to disruptive growth. The findings of modifications in passage of calcium through the cell membranes provides a basis for continuing the work along those lines.

H. P. Schwan and K. R. Foster have also investigated the possibility of weak field interactions with biological tissues. In their work the researchers do not describe any theoretical interaction mechanism, but they do confirm earlier findings that the cell membrane plays an important part in determining the cell electrical characteristics with respect to radiofrequencies.[123]

At this opposite end of the energy exposure issue, low-level exposure, we find that researchers are consistently reporting biological effects at surprisingly low radiation levels. In very early experiments, conducted to

[123] *H. P. Schwan and K. R. Foster, "RF-Field Interactions with Biological Systems: Electrical Properties and Biophysical Mechanisms," Proceedings of the IEEE 68, no. 1 (January 1980).*

investigate microwave induced hearing sensations, J. C. Lin confirmed that a biological hearing effect is induced at power density levels hundreds or thousands of times lower than levels previously thought to cause any effects. In essence, Lin confirmed what USSR researchers have been insisting all along. That is, the exposure limits in the United States and other Western countries are much too high and not really based on biological effects.

Interestingly, the IEEE/ANSI standards are claimed to have been established at a level that is ten times lower .
Than any measured biological effect. But in 1977 Lin demonstrated just such an effect at levels much lower than the limit of the safe exposure standard. The effect was described as a thermal shock wave caused by a rapid expansion of tissue due to energy absorption and propagating within the brain. Today's "safe level" of radiofrequency exposure remains at least 100 times higher than the threshold levels found by Lin. At that time Lin stated:

The effect is of great significance since the average incident power densities required to elicit the response are considerably lower than those found for other microwave biological effects and the threshold average power densities are many orders of magnitude smaller than the current safety standard of 10mW/cm².[124]

In a follow-up, or follow-on, to previous research reporting modifications in brain cells at low-level radiation exposure W. R. Adey also reported that weak modulated radiofrequency radiation results in major physiological

---

[124] *J. C. Lin, "On Microwave-Induced Hearing Sensation," IEEETransactions on Microwave Theory and Techniques MTT-25, no. 7 (July 1977):605-13.*

changes. These weak exposures, less than that which would result in temperature increases of 0.1°C, have also been observed to produce chemical and behavioral changes. Adey's findings indicate a particular sensitivity of brain tissue to radiofrequency radiation exposure that is modulated at between six and twenty Hz (cycles per second).[125] One way of observing this sensitivity is to record the changes in the brain wave patterns (EEG) of humans and other animals as they are exposed to the low—level radiation. In some cases the modified EEG patterns persisted for several days. Adey has proposed that the radiation fields lead to a disruption of inter-cell communication and that the disruption of that communication can lead to uncontrolled cell growth. But, the safety standards do not consider that low level radiofrequency energy absorption reorients cells or disturbs the equilibrium of biological and electrophysical processes of cells within the brain of humans.

These researchers have long been engaged in the investigation of the effects produced in brain tissue as a result of low-level exposures to radiofrequency radiation. Typically, they employ radiation levels low enough to rule out any measurable tissue heating and concentrate instead on the effects of low frequency modulation of the applied frequency. In their most recent report they state that

Evidence has accumulated that sensitivity of brain tissue to specific weak oscillating electromagnetic

---

[125] *W. R. Adey, "Frequency and Power Windowing in Tissue Interactions with Weak Electromagnetic Fields," Proceedings of the IEEE 68, no. 1 (January 1980):119-25.*

fields occurs in the absence of significant tissue heating.[126]

The sensitivity includes modifications of the passage of conductive ions through the membrane of brain cells.

The researchers go on to explain that the passage of calcium and potassium ions through the brain cell membrane is fundamental to brain activity. Disturbances in this communication link are shown by modifications to the EEG readings of test subjects. These modifications have been/demonstrated and documented by these and other researchers, as described earlier.

During 1988 S. F. Cleary presenteda review of the state of research related to nonthermal interactions and effects of radiofrequency radiation. His conclusions include the understanding that

> ***cellular studies provide convincing evidence that RF radiation, and other types of electric or magnetic fields, can alter living systems via direct nonthermal mechanisms, as well as via heating.*** [127]

Cleary also pointed out that since there was, at that time, a lack of understanding about the interaction mechanisms and effects of low-level radiofrequency radiation exposure, the safety standards should be considered only an interim expedient. More specifically, the safety standards established during 1982 were only a guess.

---

[126] *W. R. Adey and S. M. Bawin, "Binding and Release of Brain Calcium by Low—Level Electromagnetic Fields: A Review," Radio Science 17, no. 5S (September—Cctober 1982):149S—57S.*

[127] *S. F. Cleary, "Biological Effects of Radiofrequency Radiation: An Overview," Electromagnetic Biointeraction (New York: Plenum, 1989), pp. 59-80.*

S. Szmigielski proposed that cellular or systemic damage may be related to long—term exposure to weak electromagnetic fields. His basis for such a proposition is tied to the many reports of behavioral, neurological, and reproductive abnormalities resulting from such exposures.
He also finds that

"there were no evidences and arguments to support this view . . . that EMFs were not carcinogenic."[128]

In other words, there never has been any evidence to indicate radiofrequency radiation is less harmful than X rays or UV radiation.

There is nothing inherently special about radiofrequency radiation that should make it less harmful. Simply because the scientific community has not established the specific interaction mechanisms does not warrant premature claims regarding safety. The industry and government have not performed research to warrant any claims of safety.

The industry claims of safety amount to a belief system but not science. They have repeated the wishful thinking among themselves so often and for so many years now that they have come to think that it has some basis, but it has none. The industry would have us believe that since only some of the research provides evidence of tumor growth and mental function effects there is no scientific proof of danger.

---

128 *S. Szmigielski and J. Gil, "Electromagnetic Fields and Neoplasms," Electromagnetic Biointeraction (New York: Plenum 1989), pp.81-98.*

For example, if someone throws 100 darts at a balloon and only the last dart thrown strikes and breaks the balloon are we to conclude that darts do not break balloons? Are we to interpret the results as an average of all the darts thrown? The average indicates that thrown darts do not break balloons. But we surely know that one well thrown dart will indeed break the balloon. More likely we conclude that the previous ninety-nine tests, or experiments, did not provide accurate results.

Let's apply the same basis for judgment with respect to the hundreds of reports of experiments and computer analysis related to biological effects due to radiofrequency radiation exposure. Some of those reports provide no findings of excess energy absorption, excess heating, or biological effects of any kind. But not finding an effect doesn't mean that there is no effect. It just means the research experiments did not find it—the "darts" may have missed the target.

However, much of the research provides experimental findings that do conclude that the absorption of radiation is excessive; that there are local "hot spots" of intense energy absorption in the human brain; that low-level exposures cause mutations of DNA and chromosome structure; and that radiofrequency energy exposure results in memory changes. Just as with the balloon and dart experiment, ninety-nine poorly performed experiments do not wipe away the scientific importance of one valid experiment that shows that radiofrequency radiation has the damaging effects that we now know.

With that in mind we return to Szmigielski's comments on the state of the scientific knowledge of these effects. He states that it appears that two types of neoplasms predominate-leukemias and brain tumor.

Of course, he is referring to radiofrequency radiation as the initiator or promoter of the malignancies.

In his conclusions Szmigielski indicates that there are two problems to be considered:

> ***Increased risk may refer evenly to all members of the population, but the risk may be assessed as tolerable in terms of population and costs of advancing civilization.***
> ***. . . In the population there are individuals that are exceptionally sensitive to the applied factors and these individuals develop neoplasms with enormously high odds and increase the rate for the whole population. Recognition and elimination of sensitive individuals would lower the population rate to normal values.***

Let's consider the two problems one at a time. The first that has been identified suggests that everyone will be at some increased risk, but that somewhere some unknown group of almighty individuals has "assessed the increased risk to be tolerable." That is, if you develop brain cancer the risk is tolerable to the group who performed the assessment. If you die of brain cancer the risk is tolerable as a cost of advancing civilization. That is the decision that the "assessors" have made. Typically those, who assume the burden of a risk are not the assessors of that burden. Usually it's some financially interested group making the decisions—so, too, in this instance. Who decided that the Challenger space shuttle astronauts should assume the risk of an explosion caused by rocket motors not designed for freezing temperatures? Not those at risk.

Who decided that the passengers of a ferryboat crossing the Baltic Sea should assume the risk of sinking because of leaky doors on the ship? Not the passengers.

Who decided that owners of pickup trucks with side-mounted gas tanks should assume the risk of explosion? Not the owners.

Who decided that the owners of portable cellular telephones should assume the risk of developing brain tumors, brain cancer, memory deficits, or increased accidents? Not the owners?

Typically those who make such decisions are the economically interested parties. In the case of the issue at hand, those interested parties include the cellular telephone manufacturers and service providers acting in concert with your government. Make no mistake, the success of the cellular telephone industry is significant revenue business for the government. In addition, the military loves the technology; the FBI loves it; the CIA, the BATF, the INS, the IRS all love it. What's not to like about it? The technology is wonderful. The hidden dangers are the problem. The powers and significant players in government and industry don't want to concern themselves with the real-world issues of danger and damage to the population. They, instead, determine that the population will assume an "acceptable risk."

And so we progress to the point where some researchers, in concert with the industry interests, propose cost/benefit decisions, biased epidemiological studies, and "risk assessment" as a balance for their conclusions that radiofrequency radiation is dangerous, all of which is coupled with regulatory agencies proposing multiple "options" for safety standards, some "less costly" than others.

How is it that they have not expressed any concern for human safety? Isn't that the purpose of all of this research?

4

The Safety Standard Smoke Screen

I know very well that to sound a false alarm is a shallow and contemptible thing. But I know, also, that too much precaution is safer than too little, and I believe that less than the utmost is too little now. Better, it is said, to be ridiculed for too much care than to be ruined by too confident a security.

—Rufus Choate

1

The American National Standards Institute (ANSI) has adopted a set of electromagnetic energy exposure levels that the Institute of Electrical and Electronic Engineers (IEEE) has determined to be safe for humans. The ANSI safety standard was initially developed during the 1960s modified during the early 1980s, and modified again, most recently, during the early 1990s.

One particularly important aspect of the guidelines is that portable cellular telephones were completely exempted from compliance, testing, or regulation of any kind.

In its initial form, during the 1960s the IEEE/ANSI safety standard, known as ANSI C95.1, established a

maximum safe exposure level for radiofrequency radiation at 10.0 mW/cm². The modified version of the standard, ANSI C95.1-1982, set the maximum level for radiofrequency exposure on a sliding scale. To find the maximum exposure level it is necessary to divide the frequency, in MHz, by 300. At 845 MHz the limit would be at about 2.8 mW/cm². However, the standard was again written to exclude portable transmitters from compliance. If it were not for the categorical exclusion that exempted portable cellular telephones from any radiation exposure regulations, the devices would have been barred from the marketplace as unsafe for humans.

But how does the standard setting committee really know what is and isn't safe for people?

Most people think that regulatory agencies, such as the Food and Drug Administration and the Environmental Protection Agency, are staffed with research experts who conduct experiments and evaluate the effects of products. Most think that these government agencies take a leading and active role in performing research and establishing the safe exposure standards. This is not true in most cases. Typically, these government agencies rely on the research community to produce findings that can be evaluated to determine regulatory action. And, as noted, the research community is comprised of industry researchers and independent researchers, many of whom are funded by industry grants.

This shortage of independent government research capability becomes quite evident in view of one industry researcher's observation that

with the current budget cut-backs, the agencies of the Government will not have the time, the funds and the personnel to research the particular exposure conditions of the mobile communications

transmitters. The Government agencies however, are receptive to and take into account well documented characterization of the exposure from some RF sources. It is up to the industry to show reasonable evidence of adherence to safety standards and receive categorical exclusions. [129]

Very early in the 1980s, Gandhi[130] advised that many countries, including Canada and Sweden, had abandoned the U.S. standard of 10 mW/cm² and were moving their safe exposure standard more toward that of the former USSR, which was 1,000 times lower (0.01mW/cm²) than the U.S. standard.

Any exposure limitation that relies on power density as the guide for limiting radiation ignores much of the research of enhancements and "hot spots" that has been made known during the 1970s. Our primary concerns now are with near-zone exposure to radiation. The planewave experiments and findings ignore the enhancement effects and nonuniform radiation absorption conditions that exist with transmitters close to the human head. In 1984 R. J. Spiegel wrote that

for humans exposed to electromagnetic (EM) radiation, the resulting thermophysiologic response is not well understood. Because it is unlikely that this information will be determined from quantitative experimentation it is necessary to develop theoretical models. [131]

[129] Q. Balzano, "Evolution of RF Safety Standards and Their Impact on Mobile and Portable Transmitters," IEEE (1986):26-31.

[130] Gandhi, O. P., "State of the Knowledge for Electromagnetic Absorbed Dose in Man and Animals," Proceedings of the IEEE, Vol. 68, No. 1, January 1980, Pp. 24-32

[131] R. J. Spiegel, "A Review of Numerical Models for Predicting the Energy Deposition and Resultant Thermal Response of Humans Exposed to Electromagnetic Fields," IEEE Transactions on Microwave Theory and Techniques MTT-32, no. 8 (August 1984):730-46.

That researcher was conceding the fact that research, using human test subjects, was unethical and would not be performed. Instead, as we already know, safety standards would be based on nonhuman effects and results—laboratory animal test results.

2

Some years ago concerns about radiofrequency radiation leaking out of microwave ovens was coupled with concerns for safety by some users of portable two-way radios. At that time, the late 1970s, there was also some concern among users of portable radios that the energy radiating from a transmitting antenna could cause tissue damage. Owners and operators of those two-way radios began making demands for research evidence that would "prove" the radios were safe.

In one effort to defuse concern, research experiments were performed and subsequently published in a technical journal of the Institute of Electrical and Electronic Engineers (IEEE). Instead of yielding test results that would disprove claims of hazardous exposure to radiation, the results proved exactly the opposite—electric fields close to radiating antennas were excessive. One would expect that with these facts in hand and published worldwide the manufacturers would become alarmed and move to a position of increased research and, perhaps, take steps to safeguard the health of their customers. Instead, in a bewildering leap of illogic the industry scientists proposed that the research findings were not a concern. They brazenly proposed that physical

principles should not apply in close proximity to radiating antennas.

Imagine: industry researchers had discovered that physical principles, which held true everywhere else in the universe, did not apply in close proximity to transmitting antennas! Having taken this bold leap, based on the published research of the industry's own research scientists, the manufacturers of portable and mobile transmitting communication devices then lobbied the IEEE/ANSI standard setting committee. The industry convinced the committee to exempt portable hand-held communications devices from the safe exposure limits of the safety standard. That is, portable radios and cell phones, were categorically exempt from compliance with maximum safe exposure limits.

Consider again that the industry's own research findings during the 1970s proved that there was excessive exposure to users of portable transmitting devices, so the manufacturers decided to throw out the laws of physics. They exempted themselves from the laws of the universe in order to continue to market their products to the unsuspecting public.

The industry research clearly shows the industry's economic concern by stating that

> ***if safety standards of independent and government agencies do not take into account the peculiar nature ofthe electromagnetic energy in the close vicinity of some radiating devices, it is conceivable that the power of portable two-way communication equipment might be forced down to useless levels.***[132]

---

[132] Q. Balzano, "The Near Field of Omnidirectional Helical Antennas," IEEE Transactions on Vehicular Technology VT-31, no. 4 (November 1982):173-85.

They suggest that electromagnetics in the near-zone of antennas is somehow different than elsewhere in the universe. Their proposition is that, since they don't quite understand the physics relating the electromagnetic fields to the near-zone of antennas, safety standards should not be enforced because it would be detrimental to the industry.

Those researchers found that exposure to some antennas yields a power density of as much as 127 mW/cm² when the antenna is placed about 1 cm distant. The radiated power was only 0.02 watts. That's thirty times less than radiated from a portable cellular telephone. Yet the power density from such a low-power device was about fifty times higher than safety standards would allow. The researchers further observed that

> ***this last value should be considered extremely dangerous biologically; yet, in the near field of an antenna, such apparent power densities are reached with only 20mW of radiated power.***

Clearly, they comprehended the danger that their own research findings were yielding. They concluded that in order to meet the safety standard, the antenna that they employed could radiate no more than 0.00025 watts. That's 2,400 times lower than portable cellular telephones are allowed to emit.

3

Throughout the 1980s industry researchers continued their opposition to the proposed lowering of allowable exposure levels. They provided great insight into the thinking of the industry's lobbying tactics and interests. By

lowering of exposure limits it is meant that the allowable maximum of exposure to radiofrequency radiation was to be reduced. One industry lobbyist posed an argument in reverse logic by proposing that

> ***the old (repealed) OSHA standard level of 10mW/cm² was sufficiently high to require only relatively few precautions to ensure the safety of the workers of the land mobile industry.***

Clearly, the industry confuses compliance with a standard as ensuring safety. The researchers added:

From the above considerations it should be clear that the possibility of product liability, personal injury and negligence law suits increases with falling EME human exposure protection guides. The manufacturers of mobile and portable transmitters seem to be condemned to severe limitations in antenna installation and RF radiated power, if they want to avoid some legal consequences of the falling exposure limits.[133]

Again, the industry researchers note, in the article that was directed as a warning to manufacturers and service providers, that stricter safety guidelines will lead to increased legal problems. Never does it mention that there is a concern for the health of human operators or customers who buy the products. Industry researchers and industry-sponsored researchers had already, consistently, determined that the radiofrequency radiation to which users are exposed is dangerous.

---

[133] Q. Balzano, "Evolution of RF Safety Standards and Their Impact on Mobile and Portable Transmitters," IEEE, 1986, pp. 26-31.

During research and experiments some of those same researchers have cautioned that the near-zone of radiating antennas is particularly dangerous because of the nonuniform radiating characteristics of portable antennas and because of the added presence of the energy stored around the antenna.

Nevertheless, they choose to ignore the research, some of it their own, and misrepresent the state of research in saying that

> ***all existing or proposed U.S. standards for safety of human exposure to RF EME have very poorly defined the near field and the partial body exposure conditions. These areas have not been researched extensively and much work remains to be done to complete this task. . . (see footnote 133)***

This is undisputably incorrect. Industry scientists and others have performed substantial research that demonstrates: (1) near-zone radiation “hot spots"; (2) near-zone measurements that confirm high energy in the vicinity of the antenna; (3) radiation absorption "hot spots" in the human head; (4) efficient radiation absorption into the human head from near-zone transmit antennas; (5) that the radiation levels emitted by portable cellular telephones cannot meet any IEEE/AN SI safety standard provision (which is why they have been exempted from compliance); and (6) that to meet the safety standards the power levels of some of the portables would need to be reduced by more than a factor of 1,000.

Industry researchers by 1986 must have realized that something was happening as a result of radiofrequency radiation exposure. Even at that time some standards were being reevaluated with a downward revision in mind.

Exposure standards currently recommended by international health organizations and under consideration by U.S. Government Agencies restrict the occupational exposure to 500 µW/cm² and the environmental (general public) limit to 200µW/cm² in the band of land mobile frequencies (see footnote [133]).

This continual lowering of the maximum allowable radiation exposure had to be supported by documented research. Also, the continual reduction of the maximum radiation exposure levels had to, take place in an environment where industry lobbied heavily against the reductions. Most probably the safe exposure levels would have been proposed at much lower levels, as are the USSR standards, if not for pressure by the industry and military interests.

In an article that speaks of problems associated with the setting of safe exposure levels, Gandhi wrote that IEEE/ANSI safety standards are based on behavioral effects of laboratory animals. In order to establish a dangerous level of exposure an observable disruption of behavior must be documented.

In the absence of verified reports of injury or adverse effects on the health of human beings who have been exposed to RF electromagnetic (EM) fields, the ANSI standard was based on the most sensitive measure of biological effects—the behavioral effects on laboratory animals.134

---

134 O. P. Gandhi, "The ANSI Radio Frequency Safety Standard: Its Rationale and Some Problems," IEEE Engineering in Medicine and Biology Magazine, March 1987, pp. 22-25.

Imagine—the basis of the maximum safe exposure for humans is whether or not laboratory animals are observed to be adversely affected when exposed. Of more concern is the manner in which disruption of behavior was measured. Some researchers have documented that they did not count disruption until the laboratory animals had nearly ceased all activity.

The example detailed earlier, of observed behavior disruption in laboratory rats, underscores the point vividly. Even though the rats were exhibiting clear signs of behavior modification, the effects were not considered until the animal had a decrease of activity by 67 percent. Researchers then arbitrarily determined that if the laboratory animals resumed normal activity after the radiation ceased the long—term effects were not to be considered.

Let's take another look at the brickmason of a previous example. Assume that the bricklayer can usually lay 100 bricks each hour - all day long. However, for this experiment the bricklayer is exposed to radiofrequency radiation. As the level of radiation is increased the bricklayer begins to lay bricks more slowly. First, only 80 bricks an hour; then 50, and finally only 33. Recall that the bricklayer was able to consistently lay one hundred bricks hour after hour without let—up, but during exposure to the radiofrequency energy he continuously slowed as the radiation level was increased. Now wouldn't it make sense to notice something happening to this man when he slowed to 80 bricks an hour or even 50 bricks an hour? At 33 bricks per hour he is nearly incapacitated. But, according to the biological effects researchers that is the detection point. They would have the threshold level for observable effects set at the point where the bricklayer was only laying 33 bricks an hour.

What would they set the threshold level to for someone operating an automobile? What about a surgeon just prior to performing a difficult operation?

Gandhi writes that behavioral disruptions have been observed at 4 mW/g. However, other researchers have documented behavioral disruptions at much lower levels - less than 1 mW/g. Our earlier review of the *Scientific American* article discussed a group of such research findings at 0.1mW/g. That article also points out the concern related to "the highly nonuniform nature of SAR distribution, including some regions where there may be fairly high local SARs."[135]

4

There are also research findings that have shown that exposure to radiofrequency radiation causes damage to the DNA structure of brain cells. This is a dramatic revelation, as the cellular telephone industry has maintained that no harmful mechanism could be identified because it was not possible to cause DNA modif1cations at radiofrequencies. Now we have research reports coming from the United States, Sweden, India, Belgium, Croatia, and Germany, with others no doubt to follow, which conclude that radiofrequency exposure does cause DNA damage.

While the telecommunications industry spokesmen publicly argued that their research proves such effects are impossible, the industry's own researchers made it clear that the industry hadn't even developed the skills to perform the necessary testing.

---

[135] *K. R. Foster and A. W. Guy, "The Microwave Problem," Scientific American, 255, no. 3 (September 1980) 32-39.*

Their researchers stated that

the study of the near field has been substantially neglected.

How then can we accept the cellular industry representations of proven safety, made to the standard setting committee, when it concedes that it has neglected to perform the research? As we pointed out earlier, those industry researchers admit that

"dipole antennas, although extensively used in portable and mobile communications, have not been carefully investigated in the near field."[136]

This admission clearly indicates a lack of concern on the part of the portable communications industry as it continued with product development—Without the supporting biological effects research. It would be reasonable to presume that extensive research had been performed to provide some confidence that the devices were not dangerous. That is what the industry has been stating publicly. Instead we learn from industry engineers and scientists that very little research was conducted up to that time.

We also see how industry researchers tied their experimental results to the lobbying effort that would exempt portable products from the safety standards.

The proposed standard recognizes the possibility of encountering fields higher than the maxima of the

---

136 *Q. Balzano et al., "Energy Deposition in Simulated Human Operators of 800-MHz Portable Transmitters," IEEE Transactions on Vehicular Technology, VT—27, no. 4 (November 1978):174-181.*

Protection Guides in the close vicinity of low power radiators, like portable communication equipment. For this reason, an exclusion clause for devices operating at 1 GHz or less and with less than 7 W out-put power has been proposed" (see footnote 136).

They have clearly stated that since the safety standard cannot be met by portable hand-held transmitters; such transmitters, portable radios and portable cellular telephones for example, should be exempt.

They continue by verifying that portable transmitter products cannot meet the safety standards. The researchers state that

the Radio Frequency Protection Guides of the American National Standards Institute at 750MHz would be violated at 0.3 cm distance by a resonant dipole radiating about 1mW and at 0.5 cm distance by a radiated power of 4mW (see footnote 136).

Interestingly, a "resonant dipole" provides the most favorable condition of minimum stored energy around the antenna. For antennas of different configuration, the stored energy is many times larger. This would force the allowed radiated power level to much lower levels in order to comply with safe exposure requirements.

The researchers themselves concede that

A rigorous enforcement without exclusion of the Radio Frequency Protection Guides would render portable radios practically useless.

Strict enforcement . . . technically forbids the exposure to a resonant dipole about 19cm long, radiating 1mW. . . (see footnote 136).

Having examined their own data, these researchers conclude that in order to meet the requirements of the proposed ANSI safety standard the power from a transmitter would need to be reduced to less than 1.0 mW. That means as long ago as 1981 industry research confirmed that the transmit power level from portable cellular telephones was about six hundred times higher than the ANSI safety standards would allow. Their solution to the dangerous radiation exposure problem: exempt the portables from the safety standard.

At the outset the industry researchers established their purpose by stating,

> ***This paper addresses the question of how low the power radiated by a dipole has to be so that the field near the antenna never exceeds the ANSI·proposed protection guides for distances greater than 0.3cm, which is the spacing that at times separates the antenna from the head of a portable radio user .... [A] radiated power of a few milliwatts is enough to exceed the proposed radiation protection guides at 750MHz .... [S]uch reticence in accepting the clause probably resides in the fact that the near field of antennas is largely uninvestigated.***[137]

The experimental data, presented in graphical form, clearly demonstrate nonuniform electric field intensity in the near—zone of the radiating antenna. The significance of that disclosure is to confirm the concept of nonuniform near—zone radiation and energy. But these scientific revelations couldn't deter an industry that exists solely by

---

[137] *Q. Balzano, et al., "The Near Field of Dipole Antennas, Part 1: Theory," IEEE Transactions on Vehicular Technology, Vol. VT-30, no. 4, (November 1981) 161-174.*

product development and sales. A problem of this magnitude needed to be dealt with or else the notion of portable transceivers was dead. And the problem was dealt with—by suppression.

5

The cellular telephone industry spokesmen would like to argue that there is no proof that operating a portable cellular telephone while driving an automobile has led to an increase in traffic deaths. This is a very narrow measuring stick to use in its argument, for we know that most cellular telephone calls are not performed on the freeways at high speed. Most calls are made within cities and suburban areas where traffic incidents are likely to be less severe and result primarily in property damage and personal injury but less often death. The diminished motor skills of drivers are more likely to show up in these accidents and also in accidents where the cellular telephone user is an uninvolved contributor, due to erratic driving, who simply drives away from the scene and leaves the damage behind.

The 1986 Scientific American article that carried the "correction" of Guy and Foster provided additional graphical data related to the IEEE/ANSI safe exposure setting process.[138] The safe exposure level is supposedly set to be ten times lower than the level at which behavioral or biological effects have been observed in laboratory animals. That SAR is set at a level of 0.4 mW/g. The graphical data of reported behavioral and biological effects show

---

[138] *K. R. Foster and A. W. Guy, "The Microwave Problem," Scientific American 255, no. 3 (September 1986):32-39.*

a number of findings at less than 0.1 mW/g. Two such findings occur at about nine hundred MHz while three others occur at about fifteen hundred MHz. That cluster of behavioral effects data is certainly at a much lower level than the IEEE/ANSI committee reports to be the "lowest" level of observed effects.

If the data cluster at 0.1 mW/g had been considered, the IEEE/ANSI level would be revised downward to 0.01 mW/g, which is strikingly close to what the Russian scientists have been advising—and using-for all of these years. But to do so would be to eliminate the portable cellular telephone industry and maybe some military programs. Certainly many high-power broadcast towers would need to be modified or moved. Instead, the standard setting committee determined that

> ***many of the effects reported at lower levels were not considered indicative of a hazard (see footnote 138).***

Very informative.

Now we learn that the IEEE/ANSI committee decided which behavioral or biological effects they wanted to include and which they didn't. Earlier we were told that the standard was based on a level below which no behavioral or biological effects were observed. Something in their subtle change of guidelines doesn't sound just right. Of course, more disturbing is that the general public still hears the older version of the safe exposure setting method.

How is it that the general public is expected to rely on the representations of the IEEE/ANSI radiofrequency exposure standards when we also learn that the committee that establishes those standards dismisses the research findings that don't suit them? It has already been

established that they will not consider any research that has not been replicated, now we also learn that the committee applies other subjective grounds for excluding research findings.

6

As the industry continues to wage its public relations battle it must do so even with the growing reports of dangerous radiofrequency radiation exposure. Industry researchers who attempt to counter the unfavorable reports—the industry's "damage control" researchers—have been known to resort to questionable models in an effort to provide results less damaging to the industry. For example, we have already learned that seemingly identical experiments performed by two groups of independent researchers have tended to provide two distinctly different results. One research team, not supported by the industry, employed a representative, although simplified, human head model to obtain radiation absorption results. Other researchers, employed or funded by the cellular telephone industry, have found a completely different level of radiation being absorbed within simulated human brains. Not surprisingly, the industry researchers reported a level much lower than the nonindustry-funded researchers.

Upon closer examination and spirited discussions at technical conferences at which the research findings were reported, it has come out that the industry-sponsored researchers have taken the liberty to modify the features of the human head and the placement of the portable telephone in an unrealistic manner. When presented to the audience the depiction was so ridiculous as to incite

laughter by the attending researchers. For one example, experimental results proudly reported at a technical conference relied on a laboratory human head model that had extremely protruding ears. The ear, projecting outward about 2 cm from the head, provided the "advantage" the experiment needed to yield favorable results. The scientists reported that the portable cellular telephone was placed against the ear of the model. Never mind that the "ear" had no basis in reality. And never mind that virtually no one would operate a phone in the positions depicted and tested. What does matter is that research findings of this nature form a significant part of the data base from which the safety standards are formed.

However, during these same conferences the nonindustry-funded researchers who provide findings of dangerous radiation absorption levels are typically met with silence by industry representatives and with concern by the others. There's nothing funny about the hazardous findings of the nonindustry research reports.

It is very clear that the stepping-stones of the published research results lead toward a conclusion of harmful effects from exposure to radiofrequency and microwave energy. The industry, instead of referring to the research base, prefers to draw from its own limited file of research results.

However, it matters not how much time or money is expended performing research and arriving at favorable results if the research is performed with the objective of steering clear of potentially disfavorable conclusions. Just as if one were searching purposely for a man lost in the woods but with the intent not to find the man, research that yields negative results can be performed repeatedly and for all time if the research is designed not

to yield the unwanted result., It takes but a single repeatable research study, performed by competent researchers, that indicates a harmful effect to render obsolete and invalid an entire storehouse of contrived research reports to the contrary.

By 1987 researchers were reporting that measurements showed actual radiation absorption is from two to five times higher than computer modeling predicted, and they were also warning that higher energy absorption could be expected in very sensitive tissues such as a human brain.

Also, it was again reported that local peak values of energy absorption vary over several orders of magnitude the “hot spot" effect. The response: some researchers suggested that a cost/benefit consideration be included when deciding safety issues. This last point is sometimes referred to as “risk management" or "acceptable risk." The problem is that the industry manages the risk and determines what is acceptable.
In this case, the decision is based on profits. The industry managers, executives, and sales representatives perceived such an enormous untapped gold mine that there was just no way that these products were going to be held back. The industry, even in 1987, was charging ahead at full steam to capture the markets while prominent university researchers were cautioning that much more research needed to be performed.

A paper by M. Stuchly[139] brings out the inconsistency of thinking among those who would establish safe exposure levels for humans. First we were educated repeatedly that safety levels were set by using laboratory

[139] M. Stuchly, "Proposed Revision of the Canadian Recommendations on Radiofrequency-Exposure Protection," Health Physics 53, no.6 (December 1987):649-65.

animals. Then we learn that, adverse effects or not, a cost/benefit consideration may be more important than real dangers from radiation exposure.

> ***There should be a sufficient data base of adverse effects on human beings and their mechanisms, which permit a quantitative analysis of health risks related to any proposed protection limit. Additionally, it may be desirable to consider a cost/benefit analysis. RF exposure standards are almost exclusively based on experimental evidence from animals . . . (see footnote 139).***

With the exception of the comment about a "cost/benefit analysis" nothing is new in that statement.

However, it is indeed striking, if not alarming, to witness supposedly independent scientific researchers speaking of cost/benefit analysis. Perhaps these researchers propose to determine if the harmful effects of the technology are outweighed by the benefit to society. If so then we must assume that the industry, government, and their researchers have determined for us just what will be an "acceptable risk." Again, as in the past, we find the clear picture of no informed consent. Government and industry have made these decisions for the population in the past. Their track record is decidedly negative and self-serving.

We have already reviewed research findings that indicate short-term biological effects at about 1 mW/g. We have also reviewed research findings that indicate that energy absorption of from 5 to 10 mW/g will result in a significant temperature rise of about 1°C in brain tissue. Stuchly, in her 1987 report, reconfirmed those findings. She continues on to clarify that the ANSl standards are

violated "even for the transmitters with relatively low RF output power" (see footnote 139).

The U.S. Environmental Protection Agency supports those findings. In the summary, Stuchly quotes the EPA as stating:

> ***The data currently available on the relationship of SAR to biological effects show evidence for biological effects at an SAR of about 1W/kg . . . (see footnote 139).***

That is, the EPA has found biological effects at 1 mW/g. Yet the IEEE/ANSI standard—setting committee ignores the 1 mW/g findings.

The U.S. EPA has recommended exposure guidelines and provided four options for consideration.

• Option #1 limits SAR due to radiofrequency radiation exposure to 0.04 mW per gram—that is, 0.00004 watts per gram. This safety level is thought to protect against all thermally related health effects. That would be a tenfold decrease compared to the current 0.4 mW/g limit.
• Option #2 would lower the existing exposure limit by a factor of 5 to 0.08 mW/g, instead of the factor of 10 proposed in option #1. Option #2 is proposed as less costly than Option #1. Why would the safety standard setting options be based on cost? Should they not be based on safety?
• Option #3 is a proposal to maintain the current exposure level limits.
• Option #4, is to provide no regulation at all but only information and technical assistance. This is not really an option but an unacceptable alternative to any regulation.

Comparing the IEEE/ANSI radiofrequency exposure limits to limits established elsewhere provides some interesting information. The IEEE/ANSI protection guide limits exposure at 845 MHz to 2.8 milliwatts per square centimeter of surface (2.8 mW/cm²). Germany limits that same frequency to 2.5 mW/cm². Great Britain limits exposure to 1.1 mW/cm². The International Radiation Protection Association limits exposure to 0.4 mW/cm². The former USSR limited exposure to 0.01 mw/cm².

If one single piece of information becomes clear from this litany of exposure limits, it should be that the IEEE/ANSI safety limits are the least restrictive, least "safe,"of the standards. That is, compliance with ANSI exposure standards still means violation of all the other standards. The USSR standard was stricter by a factor of 280. With a history of conscious disregard for their population, does it not seem peculiar that the former USSR should establish a radiofrequency exposure standard so much lower (more safe) than our ANSI safety standard? Even without consideration of the former USSR standard we observe that virtually all other countries noted have stricter standards than the IEEE/ANSI limits.

The original safe exposure recommendation was established at 100 mW/cm2. Today every bioeffects scientist would quickly admit that such an exposure level is, without any doubt, dangerous. Nevertheless, that level was established because no "reliable" evidence existed at that time that any biologically hazardous effects occurred at radiation exposure levels lower than 100 mW/cm². During the early 1950s Schwan proposed that the safe exposure level be set at 10 mW/cm². More recently, the safe exposure to radiofrequency radiation has been lowered to about 2.8 mW/cm² at cellular telephone frequencies. Today we know that it is difficult, if not impossible, to

use the power density as a measure of safety or hazard. We cannot prescribe a level of radiation at the surface of the head, for example, to specify a safe exposure. The current method of determining the presence of danger or a hazardous exposure is to measure the absorption of energy within the tissue that is being irradiated. But remember, the standards have set allowable absorption levels that are based solely on behavioral effects.[140] Some safety standards now prescribe that the maximum absorption of radiofrequency energy into any one gram of tissue should be no greater than 1.6 mW/g. Over the last forty years the "safe" exposure levels have been consistently reduced. Presently the standards propose levels that are about fifty times lower than was first thought to be "safe." This trend has continued for about forty years, and there is no reason to expect that revisions won't continue for some time into the future.

It will come as a surprise to most to learn that the IEEE/ ANSI committee is not an IEEE or ANSI committee at all. The process that leads to a designation as IEEE/ANSI safety standard is not rooted in any activity within either of those organizations. The "committee" process begins when a group of interested scientists and researchers get together and form a committee on their own. It could be a mutual interest that brings them together; but most likely it will be an industry interest. This independently formed committee acts on its own to establish any standard.

Only after it is completed is the final product presented to the IEEE for publication. In order to publish, the standard must pass the approval of the Standards

---

[140] *H. P. Schwan, "Nonionizing Radiation Hazards," Journal of the Franklin Institute, December 1973, pp. 485-97.*

Board of the IEEE. The board votes on whether the standard should be published under the IEEE label or logo. Interestingly, in the case of the radiofrequency radiation safe exposure standard many of the committee members were also IEEE Standards Board voting members.

After publication by the IEEE, but not necessarily any endorsement by the IEEE, the American National Standards Institute is free to review and adopt the standard, reject it, or ignore it. In any case, neither the IEEE nor the ANSI performs the technical or scientific research. Instead they rely on the original independent committee to have done the right thing.

7

Only since the Bioelectromagnetics Society Conference of 1994, which provided a forum for presentation of the overwhelming and multiple reverification of the energy penetration from exposure to radiofrequency radiation, did the industry researchers finally modify their posture and concede the point. As a result the cellular telephone industry quietly began a broad program to redesign its products to reduce the amount of radiation that is absorbed by the users of the portable cellular telephones. The redesign program is not widely known but includes the most significant manufacturers working in concert with some of the most prominent researchers who have confirmed the excessive energy absorption.

However, any newly designed portable phones may prove pointless, as newer research results have moved the issues to a broader front with additional revelation since 1993 and 1994 of DNA modifications and chromosome damage from radiofrequency radiation. Even before

the most recent bioeffects studies showing DNA and chromosome damage were known the extent of industry and government complicity became evident through a private conversation with a representative of the Federal Communications Commission (FCC) when he confided that

> ***the FCC doesn't want to regulate portable cellular telephones because it doesn't want to create a panic.***[141]

Yet another government agency, the EPA, reports:

> ***In the past few years, there has been a marked increase in epidemiological studies reporting an association between cancer and electric and magnetic fields.***

The U.S. Environmental Protection Agency has some fundamental problems with the way that the ANSI/IEEE committee, which produced the safe exposure document, handles the research results that it supposedly uses to establish safe exposure levels. The EPA has never adopted the IEEE/ANSI standard. Their reluctance is due in part to the committee's refusal to consider all available research data when setting the levels. Marty Halper of the EPA is quoted as saying:

> ***The group did not deal with all the data—specifically the nonthermal effects. As long as the public sees the ANSI/IEEE committee as being biased, its usefulness is limited.*** [142]

---

[141] *R. Cleveland, unpublished communication.*
[142] *"The RF Problem," Microwave News 13, no. 3 (May/June 1993).*

And the bias of which Halper speaks is obvious. We've seen it not only among the safety standard committee members but also concertedly by the military and industry. So long as the military and industry are so heavily represented on the committee they will be successful in pressing their own agenda. That agenda is to continue the production and use of radiofrequency-radiating products unhampered by restrictions and guidelines.

Those groups have been successful at using their "trump card" over and over again. That is, research funding. They control the research purse strings. They determine which programs will be funded. They determine which research studies will be replicated and which will not.

On another point the FDA's Centerfor Devices and Radiological Health strongly objected to the categorical exclusion clause even when it was reduced to 0.7 watts from 7 watts. At 0.7 watts the exclusion still exempted all the portable cell phones. They stated that

the concept of limiting the SAR induced in the body appears to be disregarded. '[The] low-power exclusion clause . . . exempts certain RF devices from the provisions of the standard only because they emit less than a specified amount of power. Recent data from technical publications and other sources indicate that certain lower-powered RF devices, such as hand-held, portable, two-way radios, cellular phones, and other personal communication devices can introduce relatively high SARs in portions of the body [the head and brain] of nearby persons. Indeed, some devices that meet the requirements of the low-powered exclusion clause can induce SARs that exceed the local-SAR limits specified elsewhere in the same standard-making the standard appear self contradictory.

Exempting hand-held portable cellular telephones on the basis of dubious conclusions published nearly twenty years earlier by a single industry research team no longer makes sense. The EPA states that it makes no sense. The FDA states that it makes no sense. The unbiased research community doesn't think it makes sense. And by now you might also think it makes no sense.

The industry has relied on its ability to forestall any new exposure level decisions based on harmful effects because researchers have been sidetracked for years trying to isolate a specific mechanism that would prove that tumors or cancer are a result of nonthermal, low-level exposures. However, the unique and critical circumstances of exposure of the human head and brain to radiofrequency radiation seem now to be recognized even by some industry proponents.

M. A. Stuchly points out the sensitivity of the brain to radiofrequency radiation:

> ***Even cursory consideration of physiology would suggest that high SARs in such tissues as brain or other vital organs are likely to be more critical in producing biological effects which may be potentially hazardous.***[143]

And she made it quite clear that the safe exposure levels recommended by C95.1 had been set too high when she repeated the earlier observations of the U.S. EPA.

> ***The data . . . show evidence for biological effects at an SAR of about 1 W/kg.***

---

[143] *M. A. Stuchly, Canadian and Other National RF Protection Guides, Electromagnetic Interaction with Biological Systems, ed. J. C. Lin (New York: Plenum, 1989), pp. 257-70.*

8

Exposure to radiofrequency radiation for the typical consumer now is greatest when that consumer picks up the portable telephone and places it against his head during a call. The select part of the body that absorbs that radiation is none other than the user's brain. And the selective temperature rise is in a small portion of that brain closest to the radiating antenna.

What researchers confirmed nearly forty years ago has been only grudgingly, quietly, and reluctantly admitted to by the cellular telephone industry; radiation absorbed from portable cellular telephone antennas selectively heats specific parts of the brain of the user.

In fact, in presenting research data at various scientific conferences it is typical to show the profile of absorbed energy within human head structures by plotting measured temperature rises. Two-dimensional views are used to represent cross-sections taken through various regions of a human head. Then the calculated absorbed energy or measured temperature increase is shown via color coding. These temperature profiles invariably show that the temperature rise, and therefore the radiation absorption, is concentrated in the part of the brain nearest the antenna.

But, with all of this research data in hand, some of which has been available for twenty or more years, and with the research now out of the industry's control, the battle over the safe exposure level continues. In the typical style of self-interested corporate executives, the managers are digging in their heels to protect their little empires—their stock options, bonuses, and other benefits. For them it's not a matter of doing the right thing for the industry, their companies, or their customers.

A good example of their outdated efforts is the continued industry attempts to convince regulators and standards committee members that a human head does not absorb energy from a transmitting antenna if the antenna is placed very close to the head. This is analogous to saying that if you sit around a campfire, a few feet away, on a cool autumn evening you will be warmed, but if you move right next to the fire, perhaps an inch or two away, you will not be warmed or burned.

But even when the unscientific arguments are exposed, the cellular industry, in concert with the military interests, can still apparently muster enough support, or muscle, to sway the outcome of the standards setting committee deliberations.

During a 1989 meeting of the ANSI committee, held in Tucson, the “interested parties" attended in force. Microwave News reported that

> ***Of the approximately 50 people at the Tucson meeting, there were eight representatives from the U.S. Navy and two each from the U.S. Army and the U.S. Air Force. In addition there were representatives from companies with major military contracts. The broadcasting and communications industries were also in evidence. 144***

This certainly appears to be a show of force by government and industry. We can judge the impact that such a gathering would have on the nonindustry committee members. Keep in mind that some of the committee members are university researchers. They must rely on government and industry for research funding.

---

144 "Revising ANSI RF-—MW Limits: Debate Often Contentious," Microwave News 9, no. 5 (September/October 1989).

In spite of, or perhaps because of, the watchful eyes of government and industry, the meeting was marked by disagreement among members. With respect to the seven-watt exclusion clause, some wanted the clause eliminated. Industry representatives indicated that the clause was justified because millions of people use the products. Still others argued that because of those millions of users the clause should be abandoned.

This provides a prime example of how the industry interests view the safety of humans. They don't argue that their devices should be proven safe. They argue that their products should be exempt because millions of people are already using them. If we extend their thinking to other products, then, in effect, the industry people are saying that the drug thalidamide should not have been regulated and removed from the market, because a lot of is women were already using it. Never mind the horrendous effects the drug produced; just leave the manufacturer alone.

Eventually the exclusion clause was deleted from the radiofrequency exposure standard. It seemed that the committee had finally realized that the exclusion was based on unfounded scientific conclusions that just couldn't pass the common sense test. It also seemed as if, finally, the industry would be forced into compliance with the safe exposure provisions of the safety standard. But a short time after that meeting, at another quietly held committee meeting attended by a select, smaller group of committee members, the exclusion clause was replaced into the standard.

Other issues of serious disagreement bring to light the manner of establishing safe exposure levels for hundreds of millions of people. At the same meeting during which the exclusion clause was thrown out, even if only

for a short time, Dr. Elder and Dr. Adair argued whether or not environmental conditions affected the level at which radiofrequency radiation becomes hazardous.

They could not even agree as to whether the ambient conditions of temperature and humidity are factors. The committee could not even agree on the most fundamental aspects of the statement of risk for humans. The entire civilized world thinks that these committee members are dedicated to scientific-based interpretation of research data. Instead they squabble amongst themselves on fundamental issues and use artful dialogue to disarm their opponents.

The ANSI C95.1 committee is outwardly represented as a group of distinguished researchers and scientists who independently and without prejudice establish the guidelines for safe exposure of the population to potentially hazardous radiofrequency radiation. We have learned that they are instead a group with divisive self-interests that employs the art of debate rather than research data to decide the issues. We have also learned that this is a group with strong industry and government ties and that during their deliberations representatives of those government and industry interests are in prominent attendance to monitor committee actions. Is there any chance that we can believe that the ANSI C95.1 committee is acting in the best interest of any except their "sponsors"?

9

Early research has established solid evidence of: (1) excessive energy absorption conditions; (2) situations where

enhanced energy absorption occurs due to the multiple layer structures of the human head; (3) nonuniform bone structures, such as internal ridges of the skull, causing increased energy absorption at some regions; and (4) dramatic increases in energy absorbed in the brain as a result of metal objects, such as metal-framed eyeglasses, in close proximity to the transmitting antenna.

Certainly this collection of scientific data should alert intelligent researchers to the prospect for harmful interaction from radiofrequency radiation. This should be especially obvious when considering placing a radiating antenna less than one inch from the head or brain of a human or when considering what safe radiation exposure conditions should be established.

Dr. Swicord, formerly of the U.S. Food and Drug Administration and now with Motorola, proposed some years ago that the exposure limits should be reduced—that is, made more restricted. He stated that

> ***at the FDA, we get information from medical device manufacturers which states that they can get beneficial effects at levels specified as safe in this guide. 145***

The medical benefits of which Swicord spoke include deep tissue heating. The guide he was speaking of is the ANSI C95.1—1982 safety standard. That guide has supposedly established the "safe exposure" level so that no thermal, biological, or behavioral effects will occur.

That "safe" level is supposed to be ten times lower than any reported effects. Nonetheless, we read that the

---

145 "Revising ANSI RF/MW Limits: Debate Often Contentious," Microwave News 9, no. 5 (September/October 1989).

FDA representative protests he has knowledge of these effects occurring at radiation levels lower than the "safe" level. That means the safety standards must be reduced by at least a factor of 10. Or at the very least the commit we should certainly investigate the exposures. But, that did not happen. Swicord was overruled.

One other point on the IEEE/ANSI safety standard issue: As of 1989 the revised safety standard had not been approved. This was primarily due to the divisive interests among the committee members. As *Microwave News* noted,

The standard has a long way to go before publication. When it is completed, it must be approved by a number of different committees. Some members such as Pollack [Dr. Herbert Pollack] and Swicord, are betting that the standard will never be approved. "[146]

The revisions that were originally argued during the 1980s became the revised safety standard C95.1—199O and again evolved into yet another version that eventually became C95.1-1992. ANSI has finally adopted the revised safety standard, but that does not mean to say that it has been adopted by the industry or government agencies. However, *Microwave News* has reported that the Board of Standards Review is investigating comments made by Dr. Swicord. Dr. Swicord is quoted as stating that

it is generally recognized that the current member-ship is not balanced in representing government, industry, and the general public. [147]

---

[146] *Ibid.*

[147] *"AN SI OKs RF/MW Standard; Questions Makeup of Committee," Microwave News 12, no. 6 (November/December 1992).*

As the entire research base points out, deep tissue destruction may have occurred by the time a warming sensation is felt in the skin. Thus we should not reasonably expect to be unharmed by these exposures just because no sensation of heat or pain is felt on the skin or scalp. We would also not expect that a laboratory animal would provide a behavioral symptom under similar exposure. We have already discussed how the brain is relatively insensitive to pain or thermal sensation. This being the case, tissue destruction in one's brain or the brain of a laboratory test subject may be occurring without the slightest indication that anything is happening. And the damage may be repeated, over and over again, each time the energy exposure takes place.

Absorbed energy levels in humans, more particularly in the human brain, have been determined analytically by computer methods and experimentally verified with laboratory models. Over the years both computer methods and laboratory models continue to increase in level of sophistication and, we trust, accuracy. From those scientific tools we know that the everyday exposures to radiofrequency energy due to operation of portable cellular telephones exceed the stated SAR safety levels.

The IRPA (International Radiation Protection Agency) has adopted 0.4 mW/g as a safe exposure level for humans based on behavioral effects in animals at 4 mW/g. Researchers have measured from 2 to 8 mW/g peak levels in laboratory models of human heads with portable cellular telephones in the operating position.

The best remedy is to avoid the use of the apparatus that causes the damaging exposure. Interestingly, that is exactly what some industry statements have advised.

They recommend only using the telephones for emergencies and using regular telephones for all other communication needs. They further recommend to limit the duration of calls to the absolute minimum. Can you imagine going to an automobile dealer and having him tell you not to drive your new car except in emergency situations and to limit your use to an absolute minimum? Wouldn't you be a little bit curious about the reasons?

We have already made note of the recent dramatic increase in near-zone exposures as a result of portable cellular telephones, but it is also important to tie this new epidemic of exposures to what researchers have been warning about since the 197 Os. That is, accepted concepts and standards were based on simple plane—wave (far zone) electromagnetic field propagation and were inadequate for the complicated near-zone fields.[148]

The industry typically proclaims that their portables are well within the requirements of the safety standards.
First of all, it must be made clear that the safety standard has been worded to exempt portable cellular phones from safety requirements or limitations of exposure to humans. One industry manufacturer has boldly stated, in an internal industry memorandum, that the portables are completely exempted from the safety standards.[149] If the exemption were to be removed and portable cellular telephones tested for compliance, it would be found that exposures are well in excess of the safety standard levels.

---

[148] *P. F. Wacker and R. R. Bowman, "Quantifying Hazardous Electromagnetic Fields: Scientific Basis and Practical Considerations," IEEE Transactions on Microwave Theory and Techniques MTT—19, no. 2 (February, 1971):178-87.*

[149] *Memorandum, Motorola, Inc., to Ameritech Mobile Communicntions, September 12, 1984.*

11

Who among you would consider sitting down in front of your microwave oven with the side of your head about one-half inch away from the door while the oven was in operation? Who among you would consider doing so for fifteen or thirty minutes? Microwave ovens are regulated to emit a very low level of radiofrequency energy, less than 1.0 mW/cm². This regulation is in effect for a good reason, that being that the very energy that is heating and cooking the food inside the oven may do exactly the same thing outside the oven.

So for microwave ovens the radiofrequency energy is regulated to be confined within. However, operating a portable cellular telephone exposes the user to higher radiofrequency radiation levels than does sitting next to a microwave oven. Why, you may ask, is it necessary to limit radiation exposure for microwave ovens in the first case but not limit exposure to radiation from cellular telephones in the second case? The answer lies in the regulatory process.

The safe exposure level for microwave ovens has been established at 1.0 mW/cm² Public exposures to broadcast transmission towers reach levels in excess of 10 mW/cm². Portable cellular telephone users are exposed, regularly, to radiation levels even higher. Any flim-flam man can provide "proof' to support whatever scam he may be promoting at any given moment. In the case of the $100 billion dollar cellular telephone industry the spokesmen and in-house researchers had a particularly interesting explanation for why they thought the high-level radiation very close to portable cellular telephones was not dangerous. These individuals, speaking for the industry, had concluded that the

electromagnetic fields near portable transmitter antennas were of a "peculiar nature" and that physical principles did not apply.

The industry exempted portable hand-held transmitters from everyday physics, and the regulatory agencies, relying on the expertise of the industry researchers, bought the line. Today we know that even though the industry researchers declared cellular telephone radiations exempt from the laws of physics, the rest of the universe has not. The evidence proves the notion of "peculiar" electromagnetic radiation to be foolish and without scientific basis.

On the representations from industry researchers, standards-setting agencies, such as the American National Standards Institute, exempted portable transmitters from any safety requirements. The repeal of that exemption to safety standards, which the cellular telephone manufacturers lobbied into existence, has finally occurred. The FCC, however, will not retroactively place exposure limits on existing models of portable cellular telephones. The reason is that in doing so consumers would learn that most of their portables operate above the accepted safety levels and either widespread outrage or panic would result. Can you imagine the concern when the 80 million owners and 150 million regular users of portable cellular telephones learn that use of these phones exposed them to excessive levels of radiofrequency radiation: that is, levels of absorbed energy into their heads that have already been shown to result in brain tissue damage?

Research Labs: The Good, The Bad

and the Biased

In any science there is a harmony between practitioners. A man may work as an individual, learning of what his colleagues do through reading or conversation; or he may be working as a member of a group on problems whose technical equipment is solitary in his own study. He, as a professional, is a member of a community. His colleagues in his own branch of science will be grateful to him for the inventive or creative thoughts he has, will welcome his criticism. His world and work will be objectively communicable and he will be quite sure that, if there is error in it, that error will not be long undetected.

--J. Robert Oppenheimer

1

Over the period of the 1970s and 1980s, during which the cellular telephone system was being engineered and developed, virtually no industry-sponsored research took place to determine the biological impact that portable cellular telephones could have on humans. Extensive research was conducted and reported on the transmission

and reception characteristics of the cellular system. Conferences were held and dedicated to the evolving scientific and engineering understanding of the cellular telephone system. Careers and fortunes were risked and made with the evolution of that technology, but the research into the biological effects never happened within the industry.

Before we ask why the researchers, in general, never performed the research, it is necessary to understand the "research-funding engine." In order that a program or set of experiments can be performed there must be a sponsor to pay for it. Outside of the industry's own labs, no professors or scientists can afford, for long, to engage in research for which there is no funding. How do you imagine laboratories, equipment, technicians, and other daily expenses could be paid for if not through funding of each and every program?

Now, from where does funding, or payment, for research come? Do universities provide money to their professors to conduct research? Not likely, for they have a difficult enough time meeting educational and administrative needs without doling out funds to researchers. Tobthe contrary, universities typically rely on their researchers to bring moneyinto the system by going out and actively pursuing research grants.

If that's the case, then who provides the funding?

For one, the U.S. government is a good source of research funding. But the government usually only provides funding in technical and medical areas that have been previously identified as being of strategic importance, such as development of the semiconductor industry, or for topics that have raised alarms in the populace, such as the effects of exposure to electric fields from power lines.

More typically, university and independent researchers must rely on industry to fund their programs. But that reliance also tends to remove the independence. With industry in the driver's seat it would not be unreasonable to expect that research that will provide favor-able results will be enthusiastically funded, while programs that are likely to provide potentially detrimental results are less likely to be funded.

Further, private industry-funded research often involves contracts drawn in a manner that allows the industry sponsor to own the results. Other contracts are drafted so that the industry sponsor can edit or censor publication of research results. Private corporations are not foolish. If they're paying the bills, they want some control.

On one side of the balance we have industry, which seems to have a stranglehold on the funding pipeline. On the other side are independent researchers who propose research that delves into areas that industry is less than enthusiastic to have cultivated.

The small amount of industry-funded research, more often than not, seems to be designed in a way that would make it difficult to come up with findings adverse to the industry's own product interests. This is called file building. By performing many research experiments that don't find a cause, or effect, or harmful exposure the industry can hope to argue by volume of research instead of validity or quality.

Occasionally the industry-funded research does report adverse results. When that happens and the research cannot be withheld from publication, there is usually some kind of "spin control" used in the discussions and conclusions of the report in an attempt to diminish the importance of the findings and to divert the reviewers' attention elsewhere.

On the other side we will always have some enterprising nonindustry scientists who still manage to perform meaningful bio-effects research. We should be grateful for those few, because they usually force the full research community into areas that industry would prefer be left uninvestigated.

Most of the credible biological effects research has been funded to some extent, and to the credit of the U.S. government, by various federal health organizations. Although much more should have been done (but that's always the case in hindsight), the research base that was established is sufficient to complete the picture.

It might seem unlikely, but also on the industry side of the balance there is a storehouse of` available published research. That industry data clearly indicates that the cellular telephone manufacturers and service providers knew, or should have known, through their own studies that exposure of humans to radiofrequency radiation emitted by transmitting portable cellular telephones is dangerous and causes biological and cognitive effects. However, the cellular industry manufacturers and service providers never cite this research.

We may think of researchers as being in either one of two possible groups—that is, those who are proponents of the telecommunications industry and those who are skeptical of the claims of the industry. Of particular interest should be the type of research conducted by each group. Those who attempt to confirm the safety of` exposure of humans to electromagnetic energy typically conduct experiments that are nonrepresentative of` actual exposures to humans and imply or explicitly claim that there is no danger. Many of the conclusions drawn by these researchers are extrapolations based on results obtained from studies of unrealistic models and plastic dolls

irradiated under circumstances much different from those used by persons operating portable transmitting devices. Many studies have been designed and reported that utilize bizarre laboratory models that provide data from which claims of safety for humans are made.

On the other end of the researcher spectrum we have the skeptical scientists who, once they have overcome the obstacles of funding, more often than not perform and report research that does not agree with the body of industry-sponsored work. In nearly all instances the new research findings and indications of hazards are reported by those researchers who are not funded by the industry.

If the system Worked differently, if the research community could draw from a pool of resources made available without contingencies imposed by the founder, then we might expect most or all of the research reports to indicate the same thing—that is, exposure to radiofrequency radiation results in biological effects to humans, some of which are temporarily disabling, some of which are permanently damaging, and still others that lead to fatal disease.

2

During the 1950s university researchers provided experimental evidence that electromagnetic waves result in effective, rapid, deep, localized tissue heating.[150] The deepest penetration of energy and greatest temperature rise was provided by radiators, or antennas, using reflectors. The reflectors are useful in redirecting some of the

---

[150] *H. P. Schwan and G. M. Piersol, "The Absorption of Electromagnetic Energy in Body Tissues," International Review of Physical Medicine and Rehabilitation, June 1955, pp. 424-48.*

radiated energy back toward the subject. In that way, not only does the subject absorb the energy with which it would normally come in contact but it also would absorb some of the reflected energy. It's exactly the same as using a sun reflector while sunbathing.

However, in the case of radiofrequency energy reflections the extra energy absorption may not be desirable. It depends on the purpose of the radiofrequency radiation. If the energy is intended for use with a diathermy or hyperthermia application, then the extra reflected energy may be of value. If the intended purpose of the radiation is for communications, such as a cellular telephone call, then any radiation absorption is not desirable; and extra radiation absorption from reflections is equally undesirable.

These research results have become increasingly important in view of the fact that not only do many operators of portable cellular telephones utilize the devices from within their automobiles but also from the fact that a large percentage of portable cellular telephone user wear metal-framed eyeglasses.

The connection to automobile use is important because the reflective metal components, components that virtually surround the occupants, play a part in modifying and enhancing the energy directed toward the head of a user. Some of the radiation from antennas located within an automobile will be reflected by the metal structure. Persons inside the automobile will absorb some of the reflected radiofrequency energy—in addition to that which they will absorb due to direct exposure. If the reflecting structure is very close, such as a door post or the metal roof, the reflected energy can be significant.

In their 1955 summary of the available research university scientists cautioned that

metal objects can modify the electromagnetic field and its effects. Any of these objects may concentrate the field . . . 151

When one is making a telephone call with a portable phone the area around the antenna is exposed to a high level of radiofrequency energy. Placing metal objects in the region of antennas and biological tissue can cause significant changes to the radiofrequency radiation patterns and energy absorption. In some cases the changes dramatically increase the amount of energy that is absorbed within parts of the brain.

M. Stuchly, et al., have found that "a resonant dipole with a reflector, may be considered as representing the worst-cause conditions, as the energy couples very well to the body."152 The "worst—cause" of which the researchers speak is maximum energy absorption. They are acknowledging that a radiating dipole antenna (resonant dipole in this instance) near a reflector will be the most dangerous in terms of depositing energy into a user. Many portable cellular telephones employ dipole antenna structures to radiate the energy.

Reflecting objects have been shown to provide large enhancements in the energy absorbed by human operators, and also induce local "hot spots" in the human brain. Another undesirable effect is produced with portable cellular telephone operators who wear metal-framed eyeglasses.

---

151 H. P. Schwan and G. M. Piersol, "The Absorption of Electromagnetic Energy in Body 'l`issues," International Review of Physical Medicine and Rehabilitation, June 1955, pp. 424-48.

152 M. Stuchly, "Exposure of` Human Models in the Near and Far Field-A Comparison," IEEE Transactions on Biomedical Engineering BME—32, no. 8 (August 1985):609-16.

The metal frames are good conductors and tend to redirect and focus the radiating energy in a way that causes increased deposition into the head and brain. N. Davies and D. W. Griffin reported that

> ***it has been found that the introduction of a pair of metal-framed spectacles can, in certain cases, cause an increase in field levels by up to approximately 20dB [ten times], a significant perturbation of the incident microwave field which should be accounted for in the setting of safety standards relating to acceptable levels of incident power.*** [153]

Clearly these researchers have warned that the effects of metal-framed eyeglasses must he considered when establishing safety standards. To date that effect has not been considered, nor has any other effect of reflectors.

The issue of metal-framed eyeglasses as an enhancer of radiofrequency energy absorption has been confirmed repeatedly but not passed along to users of portable phones. A number of independent researchers have reported that wearers of metal-framed eyeglasses who use portables will suffer an increase in absorbed radiofrequency radiation of up to 60 percent more than users who do not wear metal-framed eyeglasses. Since portable cellular telephone users are known to absorb about 50 percent of the total energy that the antenna radiates, the enhancement from metal-framed eyeglasses means that those users will absorb about 80 percent of the total radiated power.

---

[153] *N. Davies and D. W. Griffin, "Effect of Metal-Framed Spectacles on Microwave Radiation Hazards to the Eyes of Humans," Medical and Biological Engineering and Computing, March 1989, pp. 191-97.*

Also at the 1994 BEMS conference, A. H. J. Fleming reported calculations that indicate RF energy absorption by users of portable cellular telephones is in excess of 1 mW/g and recommended that some form of shielding should be incorporated to reduce the absorption of energy by the operator.[154] The researchers also confirmed that the presence of metal—framed eyeglasses will, in accordance with their experimental findings, result in a significant increase in radiation absorption.

3

Independent researchers agreed, for once, with industry researchers when the former acknowledged that work must continue to quantify near-zone exposures that are of great concern.[155] At that time, 1980, the university researchers, of course, could not anticipate the explosive growth of portable cellular telephones, but the industry researchers were well aware of` the product development within their own labs. 'l`he independent scientists, were, concerned about the dangers of` energy absorption due to near-zone exposures from other radiofrequency radiation sources.

Of most significance, at that time, was the position of the researchers that there had been little work done

---

[154] A. H. J. Fleming, "A numericul Estimate of SAR Levels in a Heterogeneous Model of the Head due to Exposure by a Mobile Phone," 16th Annual Bioelectromagnetics Society Meeting, June 12-17, 1994, abstract book, p. 65.

[155] I. Chatterjee, et al., "EIectromagnetic-Energy Deposition in an Inhomogeneous Block Model of Mun for N ear-Field Irradiation Conditions," IEEE Transactions on Microwave Theory and Techniques MTT-28, no. 12 (December 1980):1452-59.

with near-zone exposures. Only a few months later the industry researchers confirmed that position in a published paper that states:

> ***One can reasonably presume that most human exposures of any concern are and will be in the near field of electromagnetic sources. Yet the study of the near field has been substantially neglected.***

By that point in time industry research and engineering teams had been investigating portable cellular telephones for quite a few years. Even without the evolution of the portable cellular telephone, many manufacturers had been providing portable radios for commercial use for many years. Keeping this in mind, it becomes alarming to find the industry researchers admitting that

dipole antennas, although extensively used in portable and mobile communications, have not been carefully investigated in the near field.156

It was only two years later, during 1983, that the portable cellular telephone became commercially available, yet industry researchers admitted that they had not done the necessary investigation of the effects from energy radiation antennas placed next to the human head. At about the time that the revelations about the lack of research in the near-zone of antennas were made known, other researchers performed experiments with scaled-down miniature salt-water-filled spheroidal phantom models to determine near-zone exposure and energy

---

156 Balzano, et al., "The Near Field of Dipole Antennas, Part II: Experimental Results," IEEE Transactions on Vehicular Technology VT-30, no. 4 (November 1981):175-81.

absorption for humans.157 It seems that not only was meaningful near-zone research an unfulfilled need, but that which was performed took on some rather strange characteristics. It's difficult to imagine the intricate features of the human head and brain being simulated by a salt-water-filled ball.

Although the concept of using scaled—down salt-water—filled plastic spheroids to represent humans is inapplicable for any comparative purposes, the experiments do provide some data that is valuable. For one, it revealed that in the near-zone the electric and magnetic field intensities increase at a faster rate than the far-zone rate of increase predicts.

Earlier research, performed at about 1980, has provided an interesting view of the type of laboratory models that were used in some experiments to determine energy absorption and safe exposure levels for humans. In this instance, the experimental model only vaguely represents any recognizable form and is wholly comprised of a mixture of salt water and plastic powders to simulate muscle tissue. No bone, fat, or skin layers were included as are so important for any energy absorption experiments.

However, even that crude model of a rhesus monkey provided energy absorption data that was almost three times higher than the researchers expected. They commented that

it is surprising that the average SAR of the rhesus model. . . is nearly three times the expected value

---

157 M. F. Iskander, et al., "Mcasurements of the RF Power Absorption in Spheroidal Human and Animal Phantoms Exposed to the Near Field of a Dipole Source," IEEE Transactions on Biomedical Engineering BME—28, no. 3 (March 1.981):258-64.

based on the empirical formula found in the dosimetry handbook of Durney and co-workers [1978].

The handbook, to which they refer, is a product of the USAF School of Aerospace Medicine at Brooks Air Force Base, Texas.[158]

The researchers at that particular air force base figure prominently in other questionable research reports, as We shall review shortly. For the present it is interesting to note that the U.S. military, which has a history of presenting research data to "dispel fear and improve morale of personnel," has provided the handbook of radiofrequency radiation absorption. Researchers have frequently determined that the findings in the handbook understate the actual absorption of radiation that laboratory experiments conclude. They also wrote:

The strong absorption caused the average SAR of the rhesus model to exceed the theoretical predictions by a factor of 2.67. The disparity between experimental and theoretical results cannot be completely explained . . .
Certain combinations of fat and skin thicknesses produce resonances such that . . . [absorption efficiencies] may be on the order of 70% to 100% . . .
(see footnote 157).

The resonances refer to optimal conditions for the absorption of energy—the "matching" effect. That is, 70 percent to 100 percent of the energy may be absorbed. Not only are the various thicknesses of the tissue layers

---

[158] C. H. Durney, et al., Radiofrequency Radiation Dosimetry Handbook, Rep. SAM-TR-78-22, 1978, USAF School of Aerospace Medicine, Brooks Air Force Base, Texas, 1978.

important, but so, too, is the distance at which the radiation source, the antenna, is held during operation. In the region of a few centimeters from the human head, approximately 0.5-7 cm, there will be energy absorption resonances that allow for a very large portion of the energy radiated by the portable antenna to be deposited into the user's head, instead of radiated to the atmosphere.

Also, the high levels of stored energy will couple efficiently into the head and brain in addition to the 70-100 percent of the radiated energy. It's like a double dose of energy deposition. The first, radiated energy deposition, the industry reluctantly talks about because bioeffects researchers are familiar with the concept. The second source, energy stored in the near-zone fields close to the antenna, the industry never speaks of because very few, except antenna engineers and electromagnetics researchers, are aware of its existence. Under some circumstances the stored energy is 10 to 100 times greater than the radiated energy. It depends to a great extent on the configuration of the antenna. Knowledge that this great amount of stored energy may be "eff1ciently" coupled into the head and brain of a user should be enough to keep all but the most daring from using portable cellular telephones.

R. G. Olsen, et al., documented energy absorption in a full-sized human model. The absorption is again about three times higher than that which was predicted by the air force's dosimetry handbook. As with the previous experimental setup, the researchers employed a simplistic homogeneous mold of "muscle tissue equivalent" comprised of salt-water and plastic powders.[159] And as with

---

[159] *R. G. Olsen, "Far ficld Dosimetric Measurements in a Full-Sized Man Model at 2.0 GHz," Bioelectromagnetics 3, no. 4 (1982): 433-41.*

the previous experimental results the findings would have been higher by a factor of 3 to 5 if the researchers had constructed a multilayered model for the experiments.

While some researchers have employed scaled models of humans to measure radiofrequency energy absorption, others have lectured on the serious shortcomings of such methods. The fundamental problem is that the radiation exposure and energy absorption in humans has no connection to that which is observed in miniature models. A. Kraszewski, et al., agree and have stated that

> ***The main limitations of this technique are a limited spatial resolution due to the small size of the models and a difficulty in incorporating the anatomical structure into such a small model.160***

Of course, when a scaled-down model of a human that has no features such as skin, fat, bone, brain tissue, or nonuniformities is used to determine energy deposition within humans one wonders how the experimental results might be presented. Certainly there can be no correlation between the energy absorption in the model and that which is found at small "hot spot" areas in the living human brain.

These researchers confirm that scaled models used for thermographic measurements of SAR do not allow for resolution of anatomical features. Significant differences between calculated absorption and that measured in the sealed models indicates that the scaled models underestimate the energy absorption in some areas by as much as ten times.

---

160 A. Kraszewski, et al., "Specif1c Absorption Rate Distribution in a Full-Scale Model of Man at 350 MHz," IEEE Transactions on

Reports of researchers using printed circuit board antennas for hyperthermia therapy highlight an important point about using energy—radiating structures close to the human head. The researchers observed that the radiating element could be "matched" to their phantom model when the distance separating the two was less than 1 cm.[161] The term *matched* refers to optimal conditions, or best conditions, for transferring radiofrequency energy to the body in close proximity to the radiating antenna. When the radiating antenna is "matched" to the load, for instance the human head and brain, maximum energy absorption will occur. Those researchers have reconfirmed the experimental findings of others that indicate that in the near-zone absorption is enhanced by the improved "match" between the antenna and absorbing body. The "matching" effect is another enhancement mode that must be, or should have been, considered in research related to safety of portable transmitting devices such as portable telephones.

Once again, as with others in the past, those researchers reported that radiation in the near-zone is highly nonuniform. That is, in the near-zone there are regions of very high radiation and regions of very low radiation, regions of very high energy density and regions of lesser energy density. The near-zone peaks and dips average out in the far—zone to yield the uniform level of radiation.

Microwave Theory and Techniques, MTT—32, no. 8 (August 1984):779-83.

[161] I. J. Bahl, et al., "Microstrip Loop Radiators for Medical Applications," IEEE Transactions on Microwave Theory and Techniques MTT—30, no. 7 (July 1982):1090-93.

Two years later, during 1984, another group of independent university researchers again acknowledged that characterization of fields very close to radiating elements had not been completed and that much work remained to be done.[162] However, by that time it was too late. The genie was already out of the bottle; portable cellular telephones were available in the marketplace.

5

H S. Stuchly, et al., performed a series of near-zone exposure experiments by using a whole-body homogeneous model of a human. Not surprisingly they measured and reported the presence of "hot spot" energy absorption. Most of the energy was deposited in the part of the "body" nearest to the antenna, with near-zone enhancements of from 30 to 250 times greater than the average for the whole body.[163] It is puzzling that the researchers chose to place the radiating antenna at the center of the back of the model. But even that odd placement for the antenna yields data showing that most of the energy is deposited in the head and neck.

It just doesn't seem to make any sense that a human operator would place a transmitting portable radio or portable cellular telephone at the center of his back. However, even with the unrealistic placement of the radiating

---

[162] *D. T. Borup and O. P. Gandhi, "Fast-Fourier-Transform Method for Calculation of SAR Distributions in Finely Discretized Inhomogeneous Models of Biological Bodies," IEEE Transactions on Microwave Theory and Techniques 32, no. 4 (April 1984):355-60.*

[163] *S. S. Stuchly, et al., "Energy Deposition in a Model of Man: Frequency Effects," IEEE Transactions on Biomedical Engineering BME-33, no. 7 (July 1986):702-11.*

antenna, the researchers have found significantly enhanced energy absorption in the head of the human model. As a result of their experiments they determined that whole-body average SAR is not a proper dosimetric measure. In other words, they believe that it is improper to take a localized very high exposure and average it over the total body surface in an attempt to meet the IEEE/ANSI standards. They, instead, acknowledge that high energy absorption in a small localized area must be treated as a completely different circumstance from plane-wave exposures.

Another contribution to the portfolio of "nonrepresentative" research findings provides data for energy absorption within a laboratory model. However, the model is irradiated by placing the transmit antenna at the chest area of the model.164 This work was performed by the same research team that gave us data for an antenna placed at the back of a human model. An improvement over those earlier experiments is that the model currently used includes discrete materials to simulate organs such as lungs and brain.

But the researchers employ a type of "tissue cocktail," representing no known living tissue, to fill the model. It's the same type of all-purpose simulated tissue mixture that other researchers have been using instead of providing accurate simulating materials. The mixture has a combination of the electrical properties of many tissue types but none of the real properties of any actual human tissue. As mentioned, the evaluation of near-field exposure employed an antenna placed in front of the

---

164 M. Stuchly, et al., "Exposure of Man in the Near-Field of a Resonant Dipole: Comparison between Theory and Measurements," IEEE Transactions on Microwave Theory and Techniques MTT—34, no. 1 (January 1986):26-31.

model at the chest area. The researchers report that SARs approximately two to five times higher than for homogeneous models were found, which certainly conforms with the data that has been reported for many years prior to this study. That is, multilayered, heterogeneous models will more accurately represent real humans.

The researchers then make a truly unconnected leap in concluding that

the antennas and their orientation can be considered as representative of the operation of portable (hand-held) transmitters. [165]

Clearly these experiments were not designed to represent any actual radiation exposures. What the experimental findings do provide is a repetitive confirmation that simplified homogeneous models are underestimating the actual energy absorption by significant amounts; a factor of 5 was documented from this research team alone.

This research paper also serves to provide notice of the apparent "hand-in-glove" cooperation between governments and the industry, as the principal researcher was employed by the Bureau of Radiation and Medical Devices, Health and Welfare Canada, and the funding came from the U.S. Environmental Protection Agency. Another of the researchers was with the U.S. FDA and is now employed by Motorola.

---

[165] *M. Stuchly, et al., "RF Energy Deposition in a Heterogeneous Model of Man: Near-Field Exposures," IEEE Transactions on Biomedical Engineering BME-34, no. 12 (December 1987):944-49.*

Another industry research report proposes to provide information related to the "unexplored" area of heating of simulated tissue.[166] It's A curious that the researchers should describe the technical area as unexplored, even at that time, particularly in view of the full body of prior research, only some of which has been described here. In any event, the report on the heating effects to persons who operate portable radios indicates that radiation exposures might exceed a power density of 10 mW/cm². The measurement technique employed, thermal measurements taken by inserting a probe after exposure to radiofrequency energy, has been considered poor by others.

Since their measurement method is time-consuming it typically understates the maximum heating and, therefore, understates the maximum energy absorption. In addition, the experiments were performed with models employing a homogeneous gel-like substance to simulate the human brain. The industry researchers state:

> ***At the end of the exposure, the thermal probe was immediately reinserted in the dummy and the temperature increase recorded.[166]***

The researchers reported that they observed and documented an energy absorption "hot spot" associated with high electric fields at the tip of the antenna. But if the published research is any indication, they never pursued any further investigation of the "hot spot" absorption.

---

[166] *Q. Balzano, et al., "Heating of Biological Tissue in the Induction Field of VHF Portable Radio Transmitters", IEEE Transactions on Vehicular Technology 27, no. 2 (May 1978):51-56.*

Researchers have found during this period that the SAR in man models exposed to cellular telephone mobile antennas does not meet the IEEE/ANSI standard. That's not surprising, since other, earlier, researchers have consistently reported that transmitting antennas could not be operated close to the human body—the human head—without violating the safe exposure limits. That is why the industry has argued, and was successful in obtaining, a categorical exemption for their products.

During 1986 a team of university researchers performed a series of radiofrequency energy exposure experiments to determine the SARs in human models exposed to radiating antennas that were mounted on the roof—top and trunk lid of an automobile.[167,168] As in the past they employed the fiber—glass mannequins filled with the "tissue cocktail" material.

It has previously been described that this pseudo-tissue material is of no practical value in determining accurate radiation absorptions. The researchers recognize this shortcoming by stating that

> ***though it has been demonstrated by other researchers that homogeneous whole-body phantom models with an electrical conductivity 2/3 that of muscle will provide the most realistic condition for determining whole body average SAR, this is not valid for local partial body exposures nor is it valid for***

---

[167] A. W. Guy and C. K. Chou, "Specif1c Absorption Rates of Energy in Man Models Exposed to Cellular UHF Mobile-Antenna Fields," IEEE Transactions on Microwave Theory and Techniques MTT—34, no. 6 (June 1986):671-80.

[168] A. W. Guy, "Dosimetry Associated with Exposure to Non-Ionizing Radiation: Very Low Frequency to Microwaves," Radio Physics 53, no. 6 (December 1987):569-84.

determining SAR distribution within the model (see footnote 167).

Let's consider what these researchers have said. First, they have said that other researchers have validated the model that is being used. That is not true. Although the nonrepresentative mixture has been used by others and those other researchers have published experimental findings, there is nothing that indicates that the practice of using the "tissue cocktail" gives meaningful results or has been validated.

Second, by the researchers' own admission the homogeneous model mannequins: (1) will provide no information related to specific absorption in particular organs; (2) will provide no information related to energy absorption distributions within any organs, such as the brain; and (3) are not suitable for determining partial body exposures such as the amount of energy absorbed within the head.

Further, these researchers have documented other shortcomings of the mannequins as:

No attempt was made to simulate skin, fat, bone, or internal organs. (see footnote 167).

In summary, what they have provided is some gelatinous mass of material shaped in the form of various-sized humans (man, woman, child), which they have exposed to radiofrequency energy. Even with the gross misrepresentation, with respect to any living being, the results of this research are not encouraging.

Exposures were made with the mannequins positioned at various locations around the automobile. In one instance, the adult male—size mannequin was exposed

while positioned directly in front of the antenna, which places the antenna immediately in front of its stomach. A standing smaller adult-size mannequin, having surface contours similar to those of a woman, was also similarly positioned and exposed to the radiation. The child-size mannequin was positioned as kneeling in the rear seat of the auto approximately two to three feet from the antenna.

As if the nonrepresentative materials weren't sufficient to skew the data, the researchers used thermographic methods for determining the energy absorption. This technique has been evaluated earlier and found to be unsuitable. The long set-up and measurement time makes accurate measurements unlikely, as the temperatures in the mannequins change during the set-up. This results in serious understatement of the maximum energy absorption locations. The researchers alluded to the shortcomings by stating that

> ***The thermographic method used in the past was first used for determination of the SAR in the foam woman and child models exposed to the roof-mounted antennas. For later thermographic work with the trunk-mounted antenna, however, an improved thermographic technique was employed with digital recording and interactive-computer analysis. (see footnote 167).***

In spite of the "improvements" it was still necessary to physically disassemble each mannequin every time a thermal scan was to be taken.

The experimenters concluded that

the maximum power densities and SARs for the worst-case exposure conditions tested with this input power to the antenna does not satisfy the ANSI

primary exposure criteria; however, it does satisfy the 7-W and 8-W/kg exclusion clauses. (see footnote 167).

What these researchers are stating is that the experimental results do not fall within the constraints of the overall safe radiation exposure limits of the IEEE/ANSI standards; but since any portable transmitting antennas radiating less than seven 7 watts are exempt, the antennas meet the standard by virtue of that exemption.

They continue with their own description of the shortcomings of their models with statements such as:

The models used in this research were simple, homogeneous figures, but there are no technical restrictions in fabricating more advanced and realistic designs. . . (see footnote 167).

That particular research publication provides a very clear indication of how prominent researchers can produce experimental results, which do not represent energy absorptions in any living creature, and by making their own bold self-proclamations of validity try to elevate a very suspect set of experiments to the level of acceptable science. Further, and perhaps most dangerous, they try to extend the limited value of the findings to statements regarding radiofrequency energy exposures and radiation absorptions in general.

7

Average and maximum (peak) SAR may vary over several orders of magnitude for a given exposure level. That

is, the peaks of the SAR at certain spots may be hundreds or thousands of times greater than the average SAR over the whole of the tissue. For example, a human brain exposed to radiofrequency energy will have a susceptibility to absorb great amounts of energy at certain spots that may be hundreds and thousands of times more than for the rest of the brain. Quantifying near-zone exposure remains difficult, although progress is continually being made in this area. Every time a research experiment identifies a new "hot spot" location, or a new mechanism for depositing energy in a non-uniform manner the total picture becomes more clear.

During 1987 university researchers concluded that

> ***the actual SAR patterns in exposed subjects in bio-logical systems have such great variability that it is impossible to establish any meaningful relationship between SAR distributions and safe exposure standards.***[169]

That conclusion brings our attention to the fact that the industry and independent researchers are both experimenting with simulated human heads and brains. In most cases the simulated structures have none of the features of actual human heads. We have already learned to be wary of researchers voicing opinions based on experiments conducted with simplified models and experiments conducted with radiating antennas located at misleading positions. Now they have told us that, since the structure and features of the human head change so much from one individual to the next, the variability with

---

[169] *A. W. Guy, "Dosimetry Associated with Exposure to Non-Ionizing Radiation: Very Low Frequency to Microwaves," Radio Physics 53, no. 6 (December 1987):569-84.*

energy absorption may be so great that what may be a safe exposure level for one person will be dangerous for others.

Of course, this line of thinking is not difficult to follow. The physical characteristics of a small head make the small head more prone to higher levels of energy absorption than a larger head. We've already considered the research that found "hot spot" absorptions due to smaller head size. Also, the shape of the skull, thickness of subcutaneous fat, muscle layering, and how an individual holds a portable cellular telephone each contribute to make the energy absorption different from one individual to another. The important common factor, however, is that all individuals will absorb a large portion of the radiation.

Guy tells us that

> ***For a more exact SAR analysis, one should take into account the bone, the subcutaneous fat, and the complex inner geometry of the body. This would require the development of much more sophisticated models.***[170]

Given this statement, one must wonder how it is that some researchers, using simplified models, have made such bold claims of safety.

A controversy seems to have developed and some researchers are questioning the accuracy of results obtained by using the most simplistic models. Those researchers have confirmed that the simplified spheroidal models are inadequate for considering real power absorption in humans:

---

[170] A. W. Guy, "Dosimetry Associated with Exposure to Non-Ionizing Radiation: Very Low Frequency to Microwaves," Radio Physics 53 no. 6 (December I987):569—84.

It appears doubtful, however, that any useful theoretical or numerical solutions can be economically obtained for figure shapes as complex as man.[171]

K. Foster, R. Kritikos, and Schwan also determined from their research that radiofrequency irradiation of simulated biomaterials is not likely to provide accurate estimates of radiation induced temperature distribution in actual tissue.[172] Simplified structures seriously understate energy absorption and temperature rise.

Some reasons for the shortcomings are readily evident. If, for example, a researcher employs a head structure comprised of some single material (saline solution or some gel material), the results cannot reflect the important contributions of nonuniformities and dissimilar layers of an actual human head and brain which are known to dramatically affect absorption. Researchers have learned that as the complexity of laboratory models improves toward more accurate representations of the human head, the experimental results also yield increased absorption findings.

Their belief that useful data could not be economically obtained was destined to be proven wrong. In fact, even the six-layered models in use at that time were providing useful results of real power absorption. Of course, the MRI-based analytic tools developed during the 1990s are superior.

---

[171] *A. W. Guy, et al., "Determination of Power Absorption in Man Exposed to High Frequency Electromagnetic Fields by Thermographic Measurements on Scale Models," IEEE Transactions on Biomedical Engineering BME-23, no. 5 (September 1976):361.*

[172] *K. R. Foster, et al., "Effect of Surface Cooling and Blood Flow on the Microwave Heating of Tissue," IEEE Transactions on Biomedical Engineering BME—25, no. 3 (May 1978):313-16.*

Surprisingly, the same group of researchers who were so outspoken about the use of simplified models have reported that their own research, sponsored by the U.S. Air Force, employed those very same types of scaled homogeneous models. Not only were the models scaled down to about one-tenth the size of a human, but also the researchers made the models out of that same "one type fits all" mixture that they say represents the combined properties of all of the different human tissue types. This combination yields a "tissue" that has none of the properties of any human tissues. The researchers call it "2/3 muscle tissue." Nevertheless, from this "tissue cocktail" they have constructed the scaled-down doll-like structures that they used for their "scientific" experiments.

As if the nonrepresentative structure were not enough to violate the standards of good laboratory practices, the researchers also used thermographic measuring techniques to detect energy absorption. Their comments of the technique state that "the heat loss during the several minutes needed for the measurements was negligible."[179]

Other researchers have reported earlier that they were concerned with the validity of measurements that took several seconds; but these researchers were unconcerned with thermographic measurements that took several minutes. We have already discussed that thermal measurements that take long periods of time, that is, several seconds, tend to blur the temperature distinctions in tissue and completely mask thermal "hot spots." A

---

[179] *A. W. Guy, et al., "Average SAR and SAR Distributions in Man Exposed to 450-MHz Radiofrequency Radiation," IEEE Transactions on Microwave Theory and Techniques MTT—32, no. 8 (August 1984):752-63.*

measurement that takes several minutes no doubt compounds the errors and would provide little, if any, valid information.

On the basis of those toy models of human shapes, made out of a single substance that does not resemble any biological tissue and using poor thermographic methods, those researchers declared that their experimental findings prove exposure to 1 mW/cm² radiofrequency radiation is safe. The models and methods gave absolutely no indications of energy absorptions within any part of any human structure; no measurements within head models; no measurements within human torso models; no computer calculations; only radiation of little dolls. A whole body of literature is available to contradict those simplistic findings. Yet, the researchers have not referred to that published data.

Since the industry identifies the market for their products to be in the region of $100 billion it should be reasonable to expect that funding be made available to construct the more representative models. It's not as if the capability did not exist. It's just that researchers have not been funded to do the work.

Guy underscores this need by writing that

> ***since it is impossible to do many biological effect studies on man, the development of safe human exposure standards must be based on animal experimentation. (see footnote 173).***

The cellular telephone industry has taken this a step further. Rather than provide the realistic models for the researchers, industry has elected to use the public for its experiments. Others reconfirmed what Guy reported.

They stated in 1987 that

among the remaining areas where more work is still needed in RF dosimetry research is the quantification of the near-field absorption by biological models. It is generally feared that the near field may possibly contribute to excessively hazardous absorption conditions.[174]

Perhaps this scientist has been remiss in keeping up with the research literature, but the prospect of near-zone absorption hazards has been proposed, quantified, confirmed, and reconfirmed. There is no maybe about it: "hot spots" dominate the concerns when the human head is exposed in the near-zone of radiating antennas.

Usually the purpose of computer analysis is to verify the experimental results obtained by others or to evaluate new techniques that others have proposed. However, these researchers employ the "tissue cocktail" material characteristics that have become all too familiar by now and which admittedly resemble no known biological tissue. In spite of this, they have performed analyses with the nonexistent material parameters in a computer model (see footnote 174). It would have been just as easy to enter accurate human tissue values, in which case the results would have some basis in reality instead of being related to a nonexistent being.

Other researchers have published depictions of SAR distributions, taken from a compu***174***ter analysis of the human head, that show that for a frontally impinging plane-wave distinct energy absorption "hot spots" are formed

---

[174] *M. F. Iskander, et al., "Near-Field Absorption Characteristics of Biological Models in the Resonance Frequency Range," IEEE Transactions on Microwave Theory and Techniques MTT—35, no. 8 (August 1987):776-80.*

within the brain.[175] This is interesting since it confirms that even plane-wave induced radiation absorption results in interior energy absorption "hot spots." In this instance the observed "hot spots" amount to an energy absorption (SAR) of 0.6 mW/g for an incident power density of 1 mW/cm². In the near-field, that same incident power density would result in a much higher SAR due to a number of enhancement factors, including the nearzone "matching" effect.

8

P. W. Barber, et al., also used a six-layer model in their analyses to arrive at findings that confirmed the earlier work of Joines and Spiegel. That is, a 30 percent increase in radiation absorption results for complex six-layered models rather than the simpler homogeneous and inhomogeneous models previously employed[176] Interestingly, for this study, the greatest peak of the enhancement effect, which the researchers call layering resonance, occurs at about 1,900 MHz—the frequency range of the PCS portables.

The researchers have found that constructing models with representative layers of skin, fat, bone, etc., leads to the “matching" effect, which actually helps the radiofrequency radiation penetrate the head structure most

---

[175] D. T. Borup and O. P. Gandhi, "Calculation of High-Resolution SAR Distributions in Biological Bodies Using the FFT Algorithm and Conjugate Gradient Method," IEEE Transactions on Microwave Theory and Techniques MTT—33, no. 5 (May 1985):417-19.

[176] P. W. Barber, et al., "E1ectromagnetic Absorption in a Multilayered Model of Man," IEEE Transactions on Biomedical Engineering BME-26, no. 7 (July 1979):400-405.

readily. We've discussed the research findings of "matching" effects earlier, and Barber has reconfirmed the effect. Since the thicknesses of these layers vary from person to person we should also expect that the exact frequency of maximum "enhancement" will vary from one person to another.

In another report, which comes from the same research lab, the researchers replicated the earlier work of Joines and Spiegel to detail a more than twofold increase (108 percent) in average SAR in a layered model over that of a homogeneous model at exposure to 1,200 MHz radiation.177 As would be expected, their data show findings of about the same increase (92 percent) at 900 MHz. Reverification of the earlier published findings confirms the need to distinguish experimental results according to the complexity of the models used. Simplified models underestimate the energy absorption by about a factor of 2 compared to a three—layer model. Earlier researchers I have reported that the energy absorption, when using a six-layered model, is higher yet by a factor of 2 to 3 times.

9

T. Kobayashi has warned that typical gel-type materials are prone178 to dehydration, deterioration and invasion by molds and bacteria. All of these effects lead to inaccurate experimental data, yet nearly all researchers who experiment with laboratory models use the gel mixtures.

---

177 H. Massoudi, et al., "Electromagnetic Absorption in Multilayered Cylindrical Models of Man," IEEE Transactions on Microwave Theory and Techniques MTT-27, no. 10 (October 1979):825-30.

178 T. Kobayashi, et al., "Dry Phantom Composed of Ceramics andIts Application to SAR Estimation," IEEE Transactions on Microwave Theory and Techniques MTT-41, no. 1 (January 1993):136-40.

He has found, and other independent researchers have verified his findings, that the gelatinous concoctions do not faithfully duplicate the electrical properties of living human tissues over any period of time. For example, a mixture may be prepared for experimental study and only a few hours later the properties of that material will have changed. Most experiments are conducted over a period of several days or weeks. In those instances the properties of the material are continuously changing during the entire course of experimentation.

Aside from his observations about the gelatin mixtures, Kobayashi provides a number of thermographic images that clearly, and dramatically, depict that radio-frequency energy is absorbed in the head substantially at the location nearest the placement of the antenna. For his experiments he has employed a mixture of dry substances. While this is still far from representing a living human head and brain, at least the electrical properties are not shifting all over creation during the data gathering process.

His findings show that even at an antenna distance of 5 cm, which is a relatively large distance by today's portable telephone designs, the energy absorption maximum is about 1 mW/g. At a more typical antenna to head spacing of 2 cm, as would be the case with some of the "flip-phone" style telephones, the energy absorption is about 3 mW/g. That's far above the safe exposure limit of the IEEE/ANSI standard, but once again, the standard exempts the phones from compliance. Again, keep in mind that this laboratory model is homogeneous —having been constructed with the new "recipe" of materials that these researchers have developed.

A series of experiments, which were designed to quantify the SAR Within a human head model, was performed with a rather interesting structure.179 Although the radiation-generating devices were portable transmitter radios and not portable cellular telephones, valuable energy absorption data would be expected. The interesting part of the experiment comes from a close inspection of the human head model.

In order to construct the model the researchers chose not to use an available human skull but, rather, fabricate a model from synthetic materials. They have provided data that show that the electric fields within the "synthetic skull" are much different from those within the human skull. But they performed the experiments with the "synthetic skull" only.

Continuing, they filled the "synthetic skull" with synthetic brain material and also included a "synthetic eye," but they acknowledge some significant variation in the material properties of the eye compared to what it should have been. This then provided an assembly comprised of a nonrepresentative synthetic skull, filled with homogeneous, featureless, synthetic brain matter, and a nonrepresentative synthetic eye. One might expect that they would begin radiation experiments at that point, but instead they did something that seems at least peculiar, if not suspect.

They added large masses of "simulated muscle tissue" to strategic areas on the surface of the "synthetic

---

179 R. F. Cleveland and T. W. Athey, "Specific Absorption Rate (SAR) in Models of the Human Head Exposed to Hand·Held UHF Portable Radios," Bioelectromagnetics 10, no. 2 (1989):173-86.

skull." At the forehead of the model they placed a layer of muscle material that is approximately 1/2 inch, or about 1.25 cm, thick. A rather large nose is formed entirely of muscle material. Each eye is completely surrounded by a circular area of muscle material, which appears to be about 3/4 inch thick. At the lower jaw areas, on each side, they have added areas of muscle tissue approximately 1 inch thick. Also, along each side of the "synthetic skull" they have added layers of muscle tissue approximately 1/2 inch thick. Finally, at the particularly susceptible region of the temporal area that has been identified by other researchers as a “hot spot" absorption area, these researchers have added a second, additional, layer of muscle material.

Now, starting with that preposterous model of a human head, which more closely resembles Mr. Bill, a claymation character from a popular television show, they performed a series of radiation exposure experiments and measured the electric field intensity within the simulated brain matter, which was itself inside the "synthetic skull."

We should keep in mind at all times that the measurements were taken at regions that were effectively shielded by the thick layers of muscle material. The significance of this human head model configuration lies in the fact that any energy radiated to the model would first be partially absorbed in the exterior coating of nonrepresentative muscle material before any of the remainder could be transmitted through the skull and into the brain material.

The experimental data show that energy absorption (SAR) within the simulated brain material, at what would be the temporal lobe of the brain, is about 2.3 mW/

g for a radio or telephone radiating 0.6 watts. For operation with the antenna in front of the face the experimental results show that as much as 2.2 mW/g will be deposited in the eye.

Now, we should recollect that earlier researchers have repeatedly determined multilayered structures (models) comprised of skin, fat, bone, dura, CSF (cerebro-spinal fluid), and brain layers provide a much higher level of absorbed energy than simplified "brain-stuff-in- skull" models. The reason is that the layers can interact to enhance the radiation absorption in a way that makes the layers covering the brain appear to be substantially invisible to the radiation. Not only have these researchers excluded the multilayering details of a proper model, but they have also compounded the error by covering the model with a layer of energy—absorbing musclelike material. This is about as realistic as placing a window shade over the outside of a window and then measuring how much visible light is passing through to the inside of the room.

But, at the same time we should not lose sight of the impact of this research . The findings of greater than 2.0 mW/g of radiofrequency energy absorption within the brain are dramatic. The ANSI safety standards limit exposure to 1.6 mW/ g. If the ANSI standards were to apply to portable hand-held transceivers this would be a clear violation of the maximum exposure limits, but existing portables are not regulated.

In addition, one of the reasons for the concept of the exclusion clause in the ANSI standard is that industry researchers argued that radiation from hand-held transmitters is not absorbed into the brain. Their reasoning stated a "peculiar nature" of the electric and magnetic fields but never described that peculiarity in physical or

any other scientific terms. In direct contradiction of those representations, Cleveland and Athey have found deep energy penetration and absorption even with a laboratory model that was constructed to minimize any energy absorption of radiofrequency radiation.

6

"Damage Control" I - the Birth of Public Deception

"I am Oz, the Great and Terrible," said the little man, in a trembling voice, "but don't strike me—please don't—and I'll do anything you want me to."

Our friends looked at him in surprise and dismay.

"I thought Oz was a great Head," said Dorothy.

"And I thought Oz was a lovely Lady," said the Scarecrow.

"And I thought Oz was a terrible Beast," said the Tin Woodman.

"And I thought Oz was a Ball of Fire," exclaimed the Lion.

"No; you are all wrong," said the little man, meekly. "I have been making believe."

—L. F. Baum
The Wizard of Oz

1

These issues of danger related to radiofrequency radiation and portable cellular telephones began taking form nearly twenty years ago. And as with most conflicting views that erupt into battles or wars, it is seldom the

igniting spark that is really the focal point of disagreement; so, too, with the developing battles over radiofrequency radiation. The issues were defined and resolved in the past by scientific research. However, the telecommunications industry can't abide by those research findings.

The telecommunications industry would never have grown to the global force, with virtually unlimited power, that we know it to have today if it accepted the scientific research. So the industry did as has been done throughout history. The industry developed a "belief" system. The wonderful thing about a "belief" system is that it doesn't require any scientific findings. And any contrary findings that do develop are easily dismissed—as being unbelievable.

The authoritative community does quite well with "belief" systems from time to time. Some examples: (1) the scientific community and dominant religious authorities "believed" that the Earth was flat; (2) the scientific community and, again, the dominant religious authorities of the time "believed" that the Earth was the center of the universe; (3) scientific calculations supported the "belief" that man could not survive travel at speeds greater than sixty mph; (4) tobacco industry representatives "believe" that cigarette smoking is not harmful and that nicotine is not addictive; (5) prior to 1900 physicists were convinced that all significant discoveries had already been made and only minor technical corrections would occur in the future.

But as Carl Sagan so elegantly phrased it and as we've taken the liberty of pointing out in the introduction to an earlier chapter,

There are many cases where the belief system is so absurd that scientists dismiss it instantly but never

commit their arguments to print. I believe this is a mistake. Science, especially today, depends upon public support. Because most people have, unfortunately, a very inadequate knowledge of science and technology, intelligent decision making on scientific issues is difficult. Some pseudoscience is a profitable enterprise, and there are proponents who not only are strongly identified with the issue in question but also make large amounts of money from it. They are willing to commit major resources to defend their contentions. Some scientists seem unwilling to engage in public confrontations on borderline science issues because of the effort required and the possibility they will be perceived to lose a public debate. [180]

Prior to 1976 there was little need to establish any defined points of view on the issues of radiofrequency energy exposure. Up to that time there were few personal transceiver devices except for the low-frequency walkie talkies used by the military and a few law enforcement groups. But with the introduction of higher-frequency portable transceivers, a distinct division among bioeffects researchers became noticeable.

Up to that time the influences of product manufacturers appeared to be less strong or, perhaps, less visibly applied possibly due to a lack of products that would have turned their attention to the bioeffects issue. However, any lack of interest was quickly replaced with a highly focused awareness, due to the fact that by the late 1970s the manufacturers were well on their way with development of the technology that would produce the first generation of portable cellular telephones. Couple to

---

[180] *Carl Sagan, Broca's Brain (New York: Random House, 1979), p. 59.*

that an emerging concern related to the safety of portable radios, such as those used by law enforcement and emergency services personnel, and it is not hard to understand how a shift in published research could ensue.

Once the bioeffects research field captured the attention of industry, it moved quickly to sweep away the body of unfavorable research and implement its own "belief" system. That system has been functioning for these past twenty years.

For whatever reasons, from about 1976 forward there has grown an increasingly marked division among researchers that places them into two distinct camps. The first subscribes to the belief that radiofrequency radiation exposure, under some conditions, will cause destructive effects in humans. The second group of researchers maintains, as does industry, that if you can't specify one, and only one, definitive causation mechanism, then there is no harm.

That is the challenge to the bioeffects research community. If researchers identify two, five, or ten interaction mechanisms that lead to the damage, the industry won't buy it. They say it must be one cause. That amounts to having a burglar demand that the victim must be able to tell the court what color shirt he, the burglar, was wearing on the night of the burglary or he gets off free. Never mind any other evidence. But how is it that such a twisted situation is allowed to exist with this telecommunications industry?

2

As researchers have continued to expand their understanding and describe the interactions of low-level radiofrequency energy with biological tissue, the conditions of

the exposures also began to draw some serious attention. Since some of that work has indicated that exposure of the brain is more critical than exposure of other parts of the body, more work in that area was, naturally, expected. At the same time, other researchers continue to emphasize that energy absorption "hot spots" are ubiquitous in biological systems.

So many different "hot spot" locations and mechanisms for creating the "hot spots" in the human brain have been identified that it's really difficult to imagine operating a portable cellular telephone without believing that one or more such "hot spots" are being continually energized within one's brain. Even today while the investigations of "hot spot" effects and mechanisms continue, researchers report additional findings of low-level radiation effects. With all of the information tying localized absorptions to the specific features of the human head and brain, shouldn't we expect that the industry and its funded researchers would insist on using laboratory models that more closely resemble the models used for computer analysis?

After all, the telecommunications industry typically employs material science specialists and university researchers to develop materials with specific properties needed for electronic circuitry. But after working the bioeffects field for more than twenty years this same innovative group of product manufacturers hasn't been able to, or hasn't thought it important enough to, develop a suitable set of synthetic materials to be used in the systems for testing the safe exposure of humans to radiofrequency radiation from transmitting antennas?

There is no problem with radiating antennas in and of themselves. The problem arises when the antennas are operated very close to an energy-absorbing material. The

human head is an excellent radiofrequency energy—absorbing material. At some frequencies it acts like a sponge and placing a radiating antenna close to the head will cause the stored energy and radiated energy to be "sucked" into the head and brain. Iskander's group reconfirmed the physics of much higher stored energy and graphically depicted the enhancement effects as a human head model is moved ever closer to a radiating element.

3

Some of the reasons given to justify the exclusion clause have already been discussed. But it may be more important to make known the fact that only a fraction of the overall committee membership is well schooled in the principles of electromagnetics and energy propagation. Those who aren't will rely on those who are—mostly industry and military scientists. Since there is a diversity of groups within the committee, each with its own particular agenda, there is also opportunity for striking mutually beneficial agreements or exerting a special kind of influence that might seem out of place in a more open forum.

Industry proponents worked closely with committee members in carving the portable transmitter products away from any regulations, much the way tobacco company lobbyists and representatives have been able to exempt their products from the various agricultural, drug, and environmental regulations.

The addition of a single paragraph or sentence, properly placed into an otherwise well drafted safety standard, can render that standard useless for the control

of radiation deposited into the brains of tens of millions of people.

Industry research both internal and published clearly indicates that company engineers and scientists are well aware of the excessive and dangerous power density levels to which users of the portable products, such as portable cellular telephones, are exposed. In some examples, which have been discussed, industry researchers confirmed that in order to comply with the proposed safety standards the portable transmitter power level would need to be reduced to about 0.001 watt. That means in order for some of the companies' portables to comply with the proposed safety standard the power would have to be reduced by a factor of about 600, and that's just to meet the power density safety level. That doesn't even consider "a safety margin for the many enhancement and "hot spot" mechanisms.

4

The IEEE/ANSI C95.1—1982 safety standard also included a safe energy absorption level based on the amount of energy absorbed within the body. However, as with the power density guide, portable radios and portable cellular telephones were categorically exempted. If the portables were required to comply with the SAR (Specific Absorption Rate) levels it would have meant a limit of 8.0 mW deposited into any one gram of tissue. The standard is also conveniently, and artificially, structured so that highly localized "hot spots" can be "averaged out" over a full gram of tissue. One gram is the smallest unit of tissue that the standards consider. Further, the standard has defined that the one gram of tissue

must be in the form of a cube. This allows researchers, motivated to do so, to arbitrarily select—to hunt, so to speak, for areas of lower energy absorption that can be used to help lower the "average" absorption level that is reported.

We already know that energy deposition into tissue results in heating. Absorption of 8 mW into a single gram (8 mW/g) or into approximately one cubic centimeter results in approximately a 1—2°C temperature increase in that tissue. We also know that temperature increases within the brain of 1—2°C will result in tissue damage. So the safety standard effectively established a "safe" exposure level that first allows for damage or destruction of brain tissue and, second, exempts the most serious offenders. Since 1982, the IEEE/ANSI standard has been further revised to limit the maximum absorption to 1.6 mW/g. Even though a blizzard of research reports now find that the portables exceed that radiation absorption level, no action is taken—the portables remain exempt by virtue of the FCC's "grandfathering" of existing products.

Without fear of being corrected, the cellular industry has always stated that their portable telephones meet the IEEE/ AN SI standards. However, the industry never says that the ANSI safety standards didn't apply to portable cellular telephones. The industry never says that the ANSI safety standards categorically excluded portable cellular telephones from any of the radiation exposure limits.

Even with all of the background activity related to tailoring the safety standards to suit the manufacturers and system operators, research continues to uncover disturbing pieces of evidence. Rather than the benign technology tho industry claims, the evidence continues to

paint a malignant picture of the effects to be expected due to human exposure to radiofrequency radiation.

Exposure standards, such as ANSI C95.1, are based on a biophysical approach that looks for observable behavioral and immediate physiological effects in laboratory animals. But damage to brain tissue is not expected to result in immediate physiological symptoms unless the damage is extensive. Long-term effects are also an entirely different matter. Even when behavioral and otherbioeffects, such as tumors, are documented in laboratory animals, a typical industry response is that the results cannot be used or extrapolated to humans. But why, then, do we not hear the same criticisms voiced when supposed "safety levels" are established by using the same laboratory animals?

C. H. Durney pointed out the apparent Catch—22 when he observed that humans cannot be used as test subjects —"guinea pigs".[181] If the cellular industry convinces the responsible government agencies that laboratory data from animal experiments cannot be used and also convinces those agencies that human experiments are unethical, then the industry is free to do as it pleases. What a wonderful environment for the free reign of unencumbered commercialization of technology. In that environment the saying "let the buyer beware" will take on a whole new meaning.

But Durney's admission is unusual because even with nuclear radiation experiments humans were used. With radiofrequency radiation it may be that the potential for harm to human test subjects is already so well

---

[181] *C. H. Durney, "Electromagnetic Dosimetry for Models of Humans and Animals: A Review of Theoretical and Numerical Techniques, "Proceedings of the IEEE 68, no. 1 (January 1980):33-40.*

known that human testing is unthinkable. With radiofrequency energy testing there should never be an instance when the testing is performed without the informed consent of the test subject—such as portable cellular phone users.

As such, the other laboratory techniques are employed to determine exposure, absorption levels, and effects. Numerical analysis is commonly employed to provide solutions for radiation absorption by computer-simulated human bodies. Sophisticated computer analysis is available for frequencies including the cellular telephone transmit range and with complex models of the human head and brain.

Currently computer models comprised of millions of cells can subdivide the human head into as many layers as exist in reality. Further, a cell size of only a couple of millimeters greatly improves the resolution available to detect localized "hot spots." Couple this with MRI techniques and the picture is of a truly sophisticated modeling capability, but it still requires proper data input for accurate output data. The old saying "garbage in - garbage out" remains true especially for the computer modeling experiments. If researchers insert nonrepresentative material characteristics, tissue types, or physical structures, their sophisticated results will be little more than sophisticated garbage.

We already know of at least a couple of instances when nonrepresentative input data and test conditions were used to arrive at completely erroneous conclusions that have been broadcast worldwide. The basis on which the industry’s representations of safty have been established is rooted solely in the "belief’ that any short-term exposure that does not cause an

immediate, observable effect must be safe. The standard-setting committee has taken the position, in the past, that if any effect were to occur they "believe" that researchers should be able to observe and measure that effect immediately. Of course, we realize that such thinking is as nonsensical as "believing" that exposure to nuclear radiation is harmless because the effects take years to be seen.

Some in the research community do not buy into the dogmatic posturing and continue the research to learn bioeffects interaction mechanisms. Today research activity related to finding biological effects tied to low-level exposures to radiofrequency radiation has moved into the forefront, while research into thermal effects continues in the background.

Most notable is a 1980 review of scientific research that nicely describes the conflicts between the two opposite research groups. In that review H. Cook, who received his funding from the National Science Foundation, concluded that some of the prior research did not proceed in a professional or scientific manner.182 Therefore, no conclusions could be drawn, with respect to dosimetry and experimental techniques, from papers presented at the suspect Fourth Tri-Services Conference (1960). In effect, Cook was indicating that the dosimetry studies had provided artifically optimistic findings.

It’s very enlightening to learn that even during the early 1980s a few researchers were outspoken on the issue of research bias. They judged some research and perhaps the industry- and military—sponsored researchers as

---

182 H. J. Cook, et al., "Early Research on the Biological Effects of Microwave Radiation: l940—1960,” Annals of Science 37 (1980):323-51

biased toward industry expectations rather than scientific knowledge.

That's a very strong conclusion to draw so early in the evolution of radiofrequency technology. We might expect that charge to be made today, in view of the raging controversy over safety issues of millions of hand-held radiofrequency transmitters. But for the industry bias in research to have become evident so long ago, when the stakes were very low, raises extreme alarm today in view of the $100 billion industry now at stake. If researchers and industry were painted as biased and disingenuous at that time, when no corporate or economic survival was at stake, what might we expect to be occurring today that has not yet come to our attention?

The shift in focus to effects caused by low-level exposures occurred for two reasons. First, effects due to high-level exposures have been fairly well documented and accepted. Second, the telecommunications industry had been successful in convincing government agencies and a large part of the research community that damaging effects must be tied to low-level exposures. This came at a time when the industry also claimed that their portable products exposed operators only to low-levels of radiation.

Inquiries questioning the safety of radiofrequency energy absorption invariably were answered with the industry response that no link had been found between low-level radiofrequency radiation exposure and hazardous biological effects. Of course, this is a false statement. Keep in mind that with the ever-present "hot spot" absorption mechanisms, even very low radiation exposures can provide enhanced locally high-level absorptions within the brain.

Let's reconsider the issue from a different perspective. Instead of pointing out reasons and evidence that confirm hazards or dangers, let's look at what researchers interested in utilizing the medical applications of radiofrequency energy absorption have observed.

In the United States, 915 MHz has been allocated by the FCC for medical use. If other frequencies were available for medical therapy, researchers and therapists would, no doubt, have selected a slightly lower frequency, because the frequency range just slightly below 900 MHz is optimal for absorption of radiofrequency energy—the frequency range corresponding to the portable cellular telephone transmit band.

Generally, these researchers with medical applications in mind are supporting the findings of electromagnetics and bioeffects researchers. That is, radiofrequency radiation is absorbed so well at frequencies in the range of portable cellular telephone transmissions that they, the hyperthermia researchers and therapists, will use it as a method of inducing heating or to destroy tissue. In the case of hyperthermia treatment the medical therapists intend to destroy cancerous tissue. In the case of portable cellular telephones, dangerous absorption levels and tissue destruction make no such distinction.

Moving ever closer to the time when the portables were placed on the market, researchers continued to voice their concerns about adverse biological effects in humans. At the same time, medical therapy researchers were enthusiastically enjoying the findings that the deep penetration effects of energy in the 700-950 MHz range were ideal for hyperthermia treatments. It might seem as if the researchers were working at cross-purposes, but

as with nuclear radiation, which can be medically beneficial as well as lethal, radiofrequency radiation can be medically beneficial as well as lethal. Recall that when nuclear radiation experiments began early in this century, no one understood that there was a danger. It was only years afterward, when some of the most creative and gifted researchers became ill and died of radiation poisoning, that the world believed there to be a danger. As with nuclear radiation, radiofrequency radiation is a two-edged sword.

6

In the search for that one specific causation trigger, one of the mechanisms for activation of latent tumor cells has been proposed that could lead to expression of malignant neoplasia. The mechanism includes promotion via a proliferation stimulus. In his hypothesis C. E. Easterly identified magnetic fields as the stimulus that can cause latent tissue damage or cell modifications.[183] When the cell subsequently reproduces, the modifications become fixed in the cell genetics.

He compares this type of tissue injury to other widely known, causes of cancerous growths resulting from trauma, including nuclear radiation, chemical exposure, and surgical wounds. Of course, since he was only proposing a mechanism, rather than confirming one, his work was easily ignored by the industry. But it was only a matter of time until the experimental research caught up

---

[183] *C. E. Easterly, "Cancer Link to Magnetic Field Exposure: A Hypothesis," American Journal of Epidemiology 114, no. 2 (August 1981):169-74.*

with his hypothesis and began providing findings of DNA and chromosome damage—exactly as he predicted.

It is interesting to note that this researcher has included surgical trauma as a known or suspected cause of cancer, since that type of trauma is a single occurrence. Some other researchers subscribe to the belief that only multiple or long-term exposures can promote uncontrolled growth. That school of thought resides in a belief of an irritant as stimulus rather than direct destruction or damage of tissue. An irritant such as, for example, asbestos or cigarette smoke residue produces a result after a long-term continual exposure. However, exposures such as nuclear radiation and radiofrequency radiation are known to cause destruction and damage to tissue even with a single exposure. Today we know that even a single exposure to low-level radiofrequency radiation causes damage to the DNA makeup of brain cells.

While scientists argue the precise mechanism that causes the chromosomal and DNA changes, the general population needs to know that exposure to radiofrequency radiation, in fact, causes the alterations. The next obvious step in public discussions is to recognize that the reported genetic effects lead to mutations of cells which is manifested as cancer.

At a U.S. Senate hearing held during August 1992, Dr. W. Ross Adey confirmed that cellular telephones produce high electromagnetic fields in the brains of users. Dr. Adey is one of the most highly respected of all researchers in the field investigating biological effects of radiofrequency radiation as well as power line effects. In his statement about the high fields, Adey highlighted the cellular telephones in a group that included microwave ovens.

The same physical processes that heat and cook tissue in the microwave oven are at work in the human brain when radiofrequency radiation is absorbed. The distinctions to be made are that: (1) in the case of the microwave oven the tissue is dead and heated deliberately; (2) with portable cellular telephones the tissue is a living human brain; (3) with portable cellular telephone use the radiation source is placed directly to the head of the user; and (4) radiation levels from microwave ovens are regulated while portable cellular telephone power densities are many times greater.

7

"Damage Control" II—A

Continuing Public Deception

In each, three elements kept suggesting the involvement of Nixon despite his constant denials:

1. Nixon had the opportunity to plan and order the obstruction of justice (as indicated in this first instance by his many meetings with men who later were indicted in the Watergate conspiracy).

2. Such plans indeed were put into effect.

3. Despite persistent appeals that he do so, Nixon never produced evidence to clear himself and, in fact, resisted releasing evidence or allowed evidence to be destroyed.

—B. Sussman

The Great Cover- Up: Nixon. and the Scandal of Watergate.

1

Even without that one specific link the FDA has stated that there is no evidence to show that the portable cellular telephones are safe, this in spite of the industry's insistence that there are 10,000 such studies. The FDA knows no such studies exist. The cellular telephone industry knows no such studies exist. You now know that no such studies exist. Now you know that

many studies contradicting the cellular industry's position do exist.

Even as research into the hazards of radiofrequency radiation exposure is taking place, communications researchers and engineers are advancing the technology to newer and expanded capabilities. A. J. Rustako, et al., have reported that microcellular communication systems at 900 MHz and at 11 GHz (11,000 MHz) may provide for significantly reduced radiated power levels necessary from portable and mobile cellular telephones.184 The idea is to place cell sites closer together so that portable cellular phones don't need to transmit as much power for the signal to reach the cell site. The reduced power radiated, about three hundred times lower than that of today's portables, would mean less power absorbed in the user's brain.

If, at the same time, the newer system were set up at 11 GHz the energy absorption within the user's brain would also be reduced significantly. Recall, other researchers have repeatedly documented that higher frequency results in reduced deep penetration of radiofrequency radiation. So, by shifting the system operation to 11 GHz the problems of energy penetrating into the human brain will be significantly reduced. However, there is a downside. Even though increased frequency provides a reduction in deep tissue penetration, it simultaneously produces an increase in superficial tissue absorption.

---

184 A. J. Rustako, gp et al., "Radio Propagation at Microwave Frequencios for Line-of-Sight Microcellular Mobile and Personal Communication," IEEE Transactions on Vehicular Technology VT-40, no. 1(February 1999):203-10.

Keep in mind, though, that the research base has indicated biological effects at very low—level exposures. The shift to 11 GHz eliminates one set of problems but not all problems. The low level radiation exposure effects and the nonuniformity effects will persist.

2

During a July 1993 press conference the CTIA (Cellular Telecommunications Industry Association) took the public relations offensive by proclaiming that their new research program Was meant to reassure the users of portable cellular telephones that they, the portables, were safe and that their research would reaffirm that position. Officials at the U.S. Food and Drug Administration were angered by the disdainful attitude of the CTIA.

In a letter to CTIA president Thomas Wheeler, Elizabeth Jacobson, deputy director for science at the Center for Devices and Radiological Health, Food and Drug Administration, wrote:

> ***Both the written press statements and your verbal comments during the conference seemed to display an unwarranted confidence that these products will be found to be absolutely safe. In fact, the unremittingly upbeat tone of the press packet strongly implies that there can be no hazard, leading the reader to wonder why any further research would be needed at all. (Some readers might also wonder how impartial the research can be when its stated goal is "a determination to reassure consumers," and when the research sponsors predict in advance that "we expect the new research to reach the same conclusion, that the cellular phones are safe.")***

We are even more concerned that your press statements did not accurately characterize the relationship between CTIA and the FDA .... [S]ince it is not yet clear whether we will help to direct the research program, it is premature to state that we will credential the research.

To sum up, Mr. Wheeler, our role as a public health agency is to protect health and safety, not to reassure customers. I think it is very important that the public understand where we stand in evaluating the possibility that cellular phones [portable cellular telephones] might pose a health risk. [185]

So there it is—the cellular industry's flagrant misrepresentation that the government agencies are participating in and supporting the program. The fact is that the FDA has not been able to come to an agreement with the CTIA because the CTIA would not provide the FDA with the necessary control over the program. In essence, the objections raised of research bias, peer review bias, and industry control of the entire program have not been removed. And the CTIA's conduct seems to reinforce those concerns.

As if that weren't enough, the U.S. Environmental Protection Agency (EPA) made charges against the adequacy of the new ANSI C95.1-1992 safety standards. The EPA has admonished the FCC not to adopt the newly revised standard because it does not represent the scientific knowledge on a number of points.

For one, the new IEEE/AN SI guideline neglects all consideration of the voluminous research data that now

---

185 *"FDA to CTIA: There Isn't Enough Data to Gauge Cellular Phone Risks," Microwave News 13, no. 4 (July/August 1993).*

indicate the existence of nonthermal effects of radiofrequency radiation exposure. In this regard the EPA disagrees with the standards committee position that they have considered all possible bioeffects mechanisms in arriving at the new standard —it has not considered low-level radiation effects. These effects have been known and continue to be revalidated with new research regularly.

Not surprisingly, the telecommunications industry has urged the FCC to adopt the revised ANSI C95.1-1992 safety standard. Om Gandhi wrote that

> ***The power limit prescribed in ANSI/IEEE C95.1-1992 under exclusions for the uncontrolled environment is certainly quite conservative for the present-day cellular telephones operating at 820-850 MHz.***

This correspondence was provided as Gandhi sent his false research findings to the FCC. In view of his "corrected" energy absorption numbers, Gandhi's endorsement of the ANSI/IEEE standard is meaningless.

How can we rely on the assurances of a researcher who splashes false research findings across the newspapers of the world one day and then quietly modifies those findings in private communications to the FCC almost a full year later?

A statement from McCaw Cellular Communications, Inc., dated January 25, 1993, cited Gandhi's wholly inaccurate, unverified, unpublished, and unreplicated research findings without a corresponding statement of concern or correction when Gandhi's gross errors became known only a short time later.

Gandhi finally reported his errors to the FCC during August 1994. He first presented evidence that his earlier

results were incorrect at the Bioelectromagnetics Society meeting during June of that year. Nonetheless, he withheld that information from the FCC and the public. According to Microwave News,

when asked why he waited so long to acknowledge them [the errors] he said that he was under no obligation to do so. [186]

We have already noted that the experimental findings that Gandhi first released at the European Congress were not peer-reviewed or published. That is one of the requisite steps the industry claims to be necessary before it will accept research findings. Curiously, those findings were never validated before being enthusiastically embraced by the cellular telephone industry.

Instead, the "news" was released to the worldwide media as "proof" that portable cellular telephones were safe. The national media picked up the proclamation and broadcast it widely. When the retractions by Gandhi came, they did so through private communications to the FCC. No news blitz and no press release accompanied the new Gandhi calculations, which, in fact, "proved" that SARs were much higher than originally proclaimed. As a matter of fact, some of the SARs were, but for the exclusion clause, above the maximum allowed by the ANSI safety standards.

As our earlier review of the radiation absorption research has pointed out, the only noteworthy findings of Gandhi's research are that the modified and corrected absorption data are now nearly identical to the findings of

---

[186] *"Cellular Phone Notes," Microwave News 14, No. 5 (September/October 1994):8.*

many nonindustry researchers. That is, the results agree that most of the radiation is absorbed within the head and brain of the user.

Even while the numerous reports of high energy absorptions continue, manufacturers claim there is no possibility of harm as a result of operating their portable cell phones. However, it is known that they engaged in research to shield the heads and brains of users from the penetrating radiation—but only after the hazard issue became public.

A number of quick fixes proved only about as effective as would reducing the power of the telephones. That is, if one simply reduced the power of the portable it would accomplish the same reduction in radiation absorption. However, that effectively makes the portables useless. Recall that many years earlier industry researchers proposed exactly the same thing. Prophetically they wrote that in order to reduce the absorption from radiation to acceptable levels the radiation from the portables would need to be reduced to levels useless for communications.

Interestingly, at the same time that the cellular telephone industry was scrambling to shore up the indefensible position, a controversy regarding safe exposure levels erupted within the U.S. Air Force. Apparently, researchers at Kirtland Air Force Base have determined that the most recently proposed IEEE/ANSI safety standards are not representative of the real hazards associated with radiofrequency radiation exposure. They have recommended that the maximum exposure level be reduced by 100 times to 0.1mW/cm2 and have adopted the reduced maximum exposure as a guideline for Kirtland workers. This is a sharp contrast to the representations coming from the air force's researchers at its Armstrong Lab in

San Antonio. Armstrong Lab spokesmen remain adamant that no harmful effects can come from radiation exposures below the thermal threshold.

This new, lower exposure standard adopted at the Kirtland Lab is consistent with a reduced exposure standard adopted at the Johns Hopkins University Applied Physics Lab and at the Ground Systems Group at the Hughes Aircraft Company.[187] The newly adopted exposure level is 100 times lower than recommended in the most recent proposed revision to the ANSI safety standard.

Isn't it interesting to watch the military react to the low exposure restrictions that have been imposed by researchers within one of its own labs? It is equally interesting to notice that a leading industry participant, such as Hughes, has adopted such drastically reduced exposure guidelines. And isn't it also interesting to find that both of the reduced exposure guidelines conform with the safety levels established by the highly regarded Johns Hopkins University?

3

Patience isn't usually a virtue in the world of manufacturing, but in this instance it may prove to be exactly that for the telecommunications industry. The industry interests know that sooner or later the current form of cellular telephone communication must change. Otherwise, the public uproar will become so great that the status quo and media control will no longer be maintainable.

---

[187] *"ANSI RF/MW Standard Challenged," Microwave News 13, no. 5 (September/October 1993):1*

The industry's hope is to have enough time to develop and implement the low-power next-generation cellular telephone system. Research into that area is ongoing. H. H. Xia, et al., have reported on a microcellular communication systems operating at 900 MHz and 1900 MHz.188

The new system is proposed to operate at a reduced power level of 10.0 mW. That is 60 times lower than the current 600 mW (0.6 W) portables and at least 300 times lower than for the satellite systems power level.

The current generation portables, operating at 0.6 watts, are a compromise between radiated power and service efficiency. Since the original cellular system was put into operation with cell sites anywhere from five to ten miles apart, it was necessary to provide portable units with as much radiated power capability as possible.

At the time that the cellular communication system was introduced there just weren't enough cellular subscribers to make it profitable to locate cell sites much closer together. Now, with the phenominal success of the cellular technology the industry is poised to remedy two ills. By putting in place a completely new cellular system with cell sites only about one thousand feet apart, instead of ten miles, the service providers will be able to operate portable units at 0.01 watts and at the same time improve service.

It's as if the two schools of research, communications and bioeffects, were finally progressing together. The advances in the "microcell" concept. are becoming very important in view of additional reports of energy absorption experiments that are continually and consistently yielding higher SAR numbers.

---

188 H. H. Xia, et al., "Radio Propagation Characteristics for Line-of-Sight Microcellular and Personal Communications," IEEE Trans. on Antennas and Propagation 4l, no. 10 (l993):1439—47.

But with these new "microcell" systems there is in downside to go along with the reduced power from the hand—held units. That downside is the need for hundreds of thousands of new cell sites. That's right—the new systems will require a cell site on almost every light, telephone, or power pole.

4

Some reporters and magazine feature writers, confused on the physics of radiofrequency radiation, have erroneously reported that we need not be concerned about energy radiated from cellular telephones because it is low-energy radiation. Such statements, clearly, reflect the reporters reliance on industry scientists to provide them with explanations, and those explanations are wrong. Certainly X rays, photon for photon, are more energetic than RF photons. But the issue here is not that of the energy of single photons. The industry representatives are confident in their belief that few nonscientific persons will understand the distinction in what they falsely represent. The fact of the matter does not lie with the energy of a single photon but, rather, with the total numbers of photons.

To put it more clearly, the energy radiated from the antenna of a portable cellular telephone typically is comprised of 1.7 x 1023 photons each second. Written in standard form this becomes 170,000,000,000,000,000,000,000 photons each second. Now it can be seen how differently the argument shapes up when we look at the real radiation from a cellular telephone antenna instead of the misrepresentations to which the comparison of photon energies lends.

Let's take it another step further. We know that X rays penetrate tissue and can cause tissue damage through cell destruction and damage. We need about 1 million microwave photons at cellular telephone frequencies to provide the same energy as an X-ray photon. So, we see that the typical radiation from a portable cellular telephone antenna is equivalent in magnitude to about 1.7 x 1017 (170,000,000,000,000,000) X-ray photons per second.

Since the radiofrequency and microwave photons each carry a smaller packet of energy than do X-ray photons, the absorption results in a different mechanism leading to cell damage. Nevertheless, the results are the same. The end result is that the absorbed energy, whether from X-ray or radiofrequency radiation, will lead to tissue damage if the energy density is high enough. In the past the industry's often—stated "belief" was that radiofrequency radiation was not energetic enough to cause DNA or chromosomal damage. Now, faced with contradictory research findings coming from all points of the earth—the industry has changed its defense by claiming that no research is available at exactly the cellular transmit frequencies. Well, if that's true then there is also an absence of safety-related research.

During 1998 J. L. Phillips189 reported research that was conducted at the cellular telephone transmit frequencies. His research did employ human cells. His research was conducted at very low power levels—low enough to rule out any heating effects. Phillips essentially replicated the DNA damage studies of Lai/Singh.

---

189 J. L. Phillips, "DNA Damage in Molt-4 Lymphoblastoid Cells Exposed to Cellular Telephone Radiolrequency Fields in Vitro," Bioelectrochemistry and Bioenenergetics 45, (1998):103—10.

His results are the same. Exposure to low levels of radio-frequency radiation causes DNA damage.

Consider the overwhelming research reporting high SAR and total energy absorption. How has the industry, the CTIA, or its WTR (Wireless Technology Research) reacted to the research of Kuster, Hombach, Lovisolo, Fleming, Garn, and even Gandhi. All of these researchers report that more than 50 percent of the radiated energy is absorbed within the head and brain.

Previously the cellular industry spokesmen pronounced that the radiation was reflected away from the user's head—even though the manufacturers have known since the late 1970s that most of the radiofrequency energy is absorbed by the user. Their response to this definitive research, which is again reported independently from all corners of the world, is to ignore that it exists. They have done nothing by way of response to their customers or future owners of their products.

They have, however, prepared a media response kit, complete with questions and answers. Some of the answers to the questions are blatantly false except for the very specific and tailored phrasology used in wording the responses.

For example, the CTIA has recommended that industry representatives reply that, "The overwhelming consensus is that these products are safe under conditions of normal use."

Who provided the consensus and what constitutes normal use? The industry has strenuously objected to research findings that included operation of the portables with the radiating antennas in a variety of positions. After all, that's exactly the operating environment for the phones. Given a roomful of users, we're sure to find ouch of them holding their phones in any of a countless variety

of positions. The industry prefers only experimental data with the antenna positioned at the maximum distance from the user's head, but that's not how most people use the phones.

In response to their own question, "Can you cite any studies indicating that cellular phones are safe?" the CTIA's own Resource Manual cites no studies—there are no reports that indicate portable cellular phones to be "safe."

There are, however, many research reports that prove exactly the opposite: that exposure to radiofrequency radiation such as that from portable cellular telephones is dangerous, causing tissue damage, DNA damage, mental defects, EEG changes, and brain tumors.

During 1993 the EPA issued a draft report of their study of the hazardous effects of exposure to radio frequency radiation. The report concluded that not enough research had been performed to say that cellular phones were safe.

During November 1994 the Government Accounting Office (GAO) issued a report of its own investigation of the health hazard issue related to cellular telephones. The report concluded that there still wasn't enough research.

Neither of those reports considered the presentations of the 16th Bioelectromagnetics Society meeting. Nor did they consider the DNA chromosomal damage reported during 1994. Since 1994 the DNA damage and chromosome change research has been reinforced manifold.

5

During the annual Bioelectromagnetics Society conference of June 1994 a special daylong "workshop" session

was organized so that researchers could present their findings in a forum dedicated to the portable cellular telephone safety issue. The industry was represented heavily by Motorola, which had been scheduled to provide both the opening and closing technical presentations. Most of the other presentations, made by a broad worldwide cross-section of researchers, appeared not to be closely tied, in the sense of funding, to industry. The results of that single day-long session proved to be devastating to the cellular telephone industry's research position.

Not surprisingly, the news of the "corrected" Gandhi research findings, first revealed during the workshop, did not receive quite the same press and media coverage as did the claims of "safety" that were trumpeted at the time of the erroneous first report. Actually, the entire conference remained unnoticed by the U.S. media even though the most definitive research to date was reported.

The workshop became a litany of similar research findings, and the truth of the matter is that the results, presented by independent researchers working around the world were consistently alarming—high SARs from typical operation of portable cellular telephones.

The majority of presentations during the workshop took the Same tone; excess energy absorption, excess SARs, and EEG modifications. However, if any one presentation was to be a blockbuster presentation it had to be Adey's.[190] Recall that Adey has been researching low-level radiofrequency radiation effects for many years. Co-incidentally, he was heavily funded by Motorola. Toward the end of a rather lengthy presentation covering a broad

---

[190] *W. R. Adey, Bioeffects of Mobile Communications Fields: Possible Mechanisms for Cumulative Dose, 16th Annual Bioelectromagneics Society Meeting, June 12-17, 1994, abstract book, p. 68. .*

scope of the work at his laboratory, Adey advised the audience that he has found exposure of cells to radiofrequency radiation results in increased proliferation, which continues long after the exposure is discontinued. This, in effect, confirms the twice-reported findings of Cleary. Of equal importance, Adey then continued that radiofrequency radiation produces DNA defects. That was a second report of DNA modifications. Recall that Verschaeve also reported DNA modifications at this same conference. Adey's reference to DNA modifications comes from research performed by Sarkar in New Delhi.

According to the way the workshop had been originally set up, the industry, represented by Motorola researchers, was to provide a technical presentation as an overview of mobile and personal communications. That presentation was not made. In its place a Motorola manager provided a very nice marketing pitch. The presentation seemed designed to let everyone in the audience, primarily researchers in need of funding, know from where the funding would come and that it hinged on the continued success of the cellular telephone industry. It was an unashamedly bold marketing statement made by a representative of the largest manufacturer in the industry.

Following the technical presentation, which did not take place, Dr. Guy was scheduled to provide a tutorial on methods of dosimetry. Dr. Guy, a longtime researcher in the field of bioeffects, as we knew by now, turned to the CTIA as one of three members of its Science Advisory Group. Guy did not attend.

Finally, the workshop was originally scheduled to conclude with a wrap-up presentation from Motorola's Balzano. Balzano did not make his presentation.

In essence, Motorola and the industry withdrew all of their presentations. Their withdrawal may have been due to the overwhelming nature of the research findings, which indicated that typical operation of portables is dangerous.

6

Recall that the WTR set out some very clear guidelines for pursuing research into areas that had earlier been found to indicate hazards. Well then, let's consider the chromosome and DNA research that indicates that low-level radiation exposure causes damaging biological effects. Certainly the WTR will place a high priority on that work. Certainly those studies qualify as "new research breakthroughs" to be replicated as quickly as possible. Or maybe the proposals to replicate that research didn't "best meet [the] needs" of the WTR and the industry. Surely the WTR would rush to have a number of qualified researchers investigating this most important issue. After all, the charter of the WTR is to ensure unbiased, independent research funded through a blind trust so as to remove any suspicions of industry corruption of the results.

It's somewhat intriguing that Motorola has privately funded a follow-up study to replicate the Lai—Singh research but not with Lai and Singh as the researchers. Funding of the replication study is viewed by some in the media as nothing more than a necessary public relations move. Since the Lai—Singh research findings have become widely known the industry has been pressured to replicate the tests—quickly.

The replication studies were performed at the Washington University at St. Louis, not to be confused with the University of Washington, at Seattle. Lai and Singh are with the University of Washington at Seattle.

Certainly some questions of research independence need to be answered. This is hardly the format that the CTIA has prescribed for independent research. The replication studies are funded by Motorola, and therefore the results will be the property of Motorola. The CTIA has maintained since early 1993 that all research will be funded through a blind trust to ensure independence. Now we find that the replication studies for the most significant, and potentially damaging, research findings will be performed with funding by and at the direction of the industry's most prominent corporation. It would seem that in order to avoid any suggestions or appearances of bias or loss of independence, the work would have been funded through the very mechanism established by the cellular industry.

In its own published documents the CTIA has stated that

by trusting the research to outside scientists and subjecting their findings to independent peer review, we are determined to assure that this process is objective. In addition, a trust arrangement funds the peer review process and the outside, independent research. [191]

It all sounds very aboveboard until we see how things have really evolved.

---

[191] *Industry response, Ans. #10, Procedures and Resource Manual for Public Health and Safety Issues, Cellular Telecommunications Industry Association (1994):B11.*

First of all, the government agencies that were supposed to take an active role in this research process have opted out because of the strong industry bias that they perceived was pushing the effort. Without a strong capability to govern the process or even participate in determinations, the government agencies would be nothing more than rubber stamps. The industry would just be using the names of those agencies, such as the FDA and EPA, to add prestige to any "findings" that the CTIA research produced.

Second, the research is not being funded by a blind trust. The research proposal for replication submitted to WTR by Lai and Singh was pidgeonholed. It was never forwarded to the peer review board. Instead, WTR took nearly a year to publicly argue small details of the research methodology, until the original researchers became discouraged and withdrew their proposal. So much for independence and blind trust funding. At the time of this writing, it is understood that no funds have actually been placed into any blind trust for research purposes.

In spite of WTR's representations of independence and research integrity, Gandhi's lab has been funded to perform dosimetry research. That is, the same research group that provided the false data and misrepresentations of safety will be performing WTR's research for energy absorption once again. But Lai and Singh—not funded. The CTIA's own procedures and resources manual insists that the research agenda highlights the "use of Good Laboratory Practices and Good Epidemiology practices in all studies conducted under the research program[192] Clearly there seems to be something amiss in

---

[192] *Procedures and Resource Manual for Public Health and Safety Issues, Cellular Telecommunications Industry Association, (1994):B5*

one lab that allows for research findings of radiation absorption to be reported and released worldwide only to be re-released at a later time with findings of energy absorption about ten times higher than initially reported.

7

Most interesting is an epidemiological study that, WTR informs us, "is designed to investigate the possible effect of exposure to radiofrequency waves on human health."[193] But wait a minute. The CTIA, WTR, and the cellular industry have insisted for the past eight years that there is a body of research that "proves" that these portables are safe. They have repeatedly told us about the "10,000 studies and forty years of research."

Now WTR has selected millions of` unwitting portable telephone users as "guinea pigs" for an epidemiological study. Certainly we can assume that when a customer approaches a salesman to make a portable cellular telephone purchase the salesman does not tell the customer, "Oh, by the way, we want you to take part in a study to see if you develop brain cancer or mental defects." The salesman tells the potential customer, if anything at all, that the telephones are "proven sale."

The CTIA's and WTR's research agenda specifically points out the epidemiological study. George Carlo, chairman of CWTR, has spoken openly about tracking the health of more than 3 million unknowing users. In the research agenda they state that "epidemiological evaluations and longitudinal [long-term I surveillance of cellular phone users, employing real-life exposure measures" will be performed.

---

[193] *Ibid., B4.*

"The SAG is also seeking proposals for investigator initiated projects consistent with the goals of the SAG program."

Research proposals are usually held in confidence. In the case of the Lai and Singh proposal, however, WTR made a public issue of the proposal. In their Fall 1994 newsletter, WTR took an opportunity to publicly deprecate the Lai and Singh research, although it had not yet, been published and was confidential information.

In the same issue of the WTR newsletter, immediately below their one-sided discussion of the Lai/Singh research, the WTR states that

All scientific proposals that have been submitted to the SAG are currently undergoing review. Proposals for concept papers critically evaluating the relevance of experimental promotion studies to human health risk assessments of RF, extrapolation of animal studies to human exposure pertaining to RF, and genotoxicity studies are still being accepted. Requests for additional proposals will be issued by the SAG in the coming months.194

The review of which WTR spoke was supposed to be an independent peer review coordinated by Harvard University's Center for Risk Analysis. The Lai/Singh proposal never made it that far. It was dragged through the mud and dumped in the gutter. But at the same time and as stated previously, WTR was seeking proposals from, researchers for exactly the same kind of research. Maybe the Lai/Singh team didn't provide the "proper" answer.

---

194 "SAG Releases Research Agenda," Science Advisory Group on Cellular Telephone Research 2, no. 1 (Fall 1994).

The final statement of WTR, given earlier, is very troubling. Just what were the goals of the WTR program? In their documents the CTIA wrote that

> ***A the overall goal of the program is to establish a solid scientific basis for policy decisions regarding wireless technology and health concerns.***[195]

Again, why don't they simply use the scientific basis of 10,000 studies and forty years of research?

Alarmingly, they have said nothing about scientific study to prove or determine the safety of their products.
The CTIA continues:

> ***It was also important that the program include a public health intervention plan that could be activated rapidly should any evidence he uncovered that use of wireless communications poses a human health risk.***

How and When does this plan become active? From the available CTIA documents it appears that the plan is already activated. Certainly the published scientific literature is now substantial in its evidence of hazards due to radiofrequency radiation exposure.

That mission statement was clearly put into effect when the Lai and Singh work became known, but put into effect in a rather bizarre manner not designed to provide timely verifications to the very significant results found by Lai and Singh. The CTIA and its Science Advisory Group recommended performing studies of the

---

[195] *Procedures and Resource Manual for Public Health and Safety Issues, (Cellular Telecommunication Industry Association, (1994) B1.*

methods and then consideration of the proposals for replication studies. That is a process that would have taken at least a year before any additional research could begin. However, Dr. Elizabeth Jacobson of the U.S. Food and Drug Administration wanted further studies to begin immediately. It is now six years since the reports of DNA damage were made known and yet there is no replication data from the CTIA's WTR. But we have had replications and additional research reported from Phillips (Loma Linda), Adey (Riverside), Roti-Roti (St. Louis), Repacholi (Australia).

As we might have anticipated, WTR did wait the year while a committee of its own experts scrutinized the methods and techniques of Lai and Singh. That further review has shown that the methods and techniques Lai and Singh used were proper. But the review bought the industry one more year.

8

The CTIA's working documents include a second-track approach to the issues of portab l e cellular telephone safety. They refer to it as risk management.

Their plan for risk management is to answer the question: "If a health problem exists, how can it be fixed?" (see footnote 192).

Wait a minute. How is it that the industry's representatives are asking questions today about hazards and issues that were supposedly resolved years ago? The answer, of course, is that the industry doesn't like the answers, which the existing research data base provides. So it ignores the findings. On the one hand the industry claims 10,000 studies proving safety; while on the other,

the industry proclaims that it is looking to find out if health problems exist.

The CTIA even proposes some action plans to respond to future research findings. Their solutions include:

labeling changes, geared toward influencing the way people use cellular phones;. . . (see footnote192).

The world has come to believe, because the industry has vowed it to be true, that portable cellular telephones are proven absolutely safe. Now their industry association proposes to use labels to tell people how to use the phone to minimize danger.

design changes, that would alter exposure patterns;. . . (see footnote 192).

Since the cellular manufacturers and the CTIA have never informed their customers that large amounts of radiation are being deposited within the user's brain, that should be an easy fix. Simply produce a "new improved" portable and who's to know the difference? In the meantime users of the current generation portables continue to act as radiation sponges.

usage restrictions .... (see footnote 192).

That is, the industry may impose restrictions or else recommend that the owners impose their own restrictions on use of their products. We might envision the restriction as something of a warning that owners who exceed a certain usage for a day or month are at greater risk of developing brain cancer.

The CTIA's resource manual continues:

> ***Should a need become apparent, these options could be implemented singly or in combination to mitigate risk. Recommendations on all of these considerations have been devised and are ready to-be put into place if need be. . . (see footnote 192).***

The truth of the matter is that all of the recommendations have already been "put into place." The industry's manufacturers now include warnings within the literature accompanying their portable phones. Design changes are already well under way. For example, in a conversation with Gandhi he offered that he is under contract with Motorola to redesign antennas and portable telephone packages to reduce the amount of radiofrequency radiation that is absorbed into a user's head. Kuster has indicated that he is also involved in antenna and package redesign for one of the largest phone manufacturers.

The FDA and EPA have already advised operators of the portables to limit the use to emergency situations if possible; to minimize use at other times; and to use regular telephones whenever they are available.

Does this not appear to be exactly the "risk management" that the CTIA has indicated within its Resource Manual? How then can the consumers be expected to continue to believe claims of "safety," since all of the steps of the CTIA risk management plan are in operation?

The most recent four or five research reports documenting the chromosomal and DNA damage are too much for the industry to tolerate without a broad public relations response. That response program is now in motion. The CTIA plans to outflank its critics with a structured program to convince the majority of the population

by using public relations statements and benign-sounding phrasology and generally acting as the likable "good old boy."

The CTIA's formal plan is to meet with local church groups, fire and emergency services departments, law enforcement agencies, and any other local groups within communities. One of their primary purposes is to convince small groups of people by using public relations rather than more broadly by using research results.

In small groups it is not so likely that someone in the audience will have the technical skills of an electromagnetics or bioeffects researcher. And when that rare occasion occurs it will be only one disaster out of hundreds of other successful meetings. Dividing, separating, and brainwashing through slick public relations is a strategy that will work if there is no opposing viewpoint. Unless there is an opportunity to present the much stronger "other side" of the issue, the industry interests will become the accepted belief`. Hut belief is not necessarily the same as truth or fact.

It seems to be increasingly clear that the industry is now faced with knowledge that both thermal and nonthermal radiofrequency radiation can cause brain tissue damage. Also, there are the memory deficits and motor skill deficits that have been confirmed repeatedly. Add to these the effects that portable cellular telephones have on pacemakers, wheelchairs, and electronic medical equipment (commonly referred to as EMI).

The industry response has been to organize a meticulously defined battle plan to blunt the inquiries made by the media and attorneys for injured consumers. That battle plan is extremely clear in view of the CTIA document "Procedures and Resource Manual for Public Health and Safety Issues." The CTIA has gone to some

effort to convince everyone that their Science Advisory Group is completely independent. The CTIA wants us all to believe that the research activity run through WTR is not influenced by the CTIA or any cellular industry members.

In reviewing the CTIA "Procedures and Resource Manual for Public Health and Safety Issues" the first statement we see is a foreword written by none other than George Carlo, chairman of WTR. In that statement Carlo wrote:

> ***[They] have developed a high-quality scientific program that is funded by the industry, but independent of its influence.*** [196]

He also wrote:

> ***If we identify any danger or potential hazard during our evaluation, the program will move immediately into a risk-management mode.***

He hasn't specified whose risk is of concern. Judging from the cellular industry's activities to date it certainly is not the risk to the public; it must be the risk to the industry. Consider the WTR response to Lai and Singh, Sarkar, Maes, Cleary, and Verschaeve. All of those researchers independently found chromosomal and DNA damage as a result of their experiments. How did WTR respond? They either assaulted the research directly or redefined their mission statement to narrow the area of interest in a way that excludes the reported research.

---

[196] *Procedures and Resource Manual for Public Health and Safety Issues, Cellular Telecommunications Industry Association, (1994) foreword.*

Compare truly independent research to the structure of the WTR—funded work. For one example, a prominent university researcher, Dr. Ken Foster, has been funded, as part of the WTR $25 million research effort, to perform radiation absorption studies. However, as part of the study he would be collaborating with WTR and with Dr. Gandhi. Where is the independent research?

Foster was supposed to be determining SARs based on measurements taken within the familiar “biomass soup" representing a human. One would expect that by now even the WTR wouldn’t try to use that antiquated practice to measure SARs. Certainly, with the open checkbook and $25 million, they can build some representative structures such as a simulated human brain that could be placed Within a simulated human skull—or real human skull—having believable interior features.

Even Dr. Foster admitted that the results he expects to obtain, using the "human soup," will be of questionable value.

However, even the most up—to-date analytic and laboratory models cannot take the place of a live-functioning human head and brain. A live human head and brain has the advantages of actual biological tissue, not the laboratory mixtures that simulate tissue. The live head and brain has contours, folds, protrusions, voids, different tissue interfaces, and shapes. The problem—it is unethical to use live humans for these kinds of laboratory “guinea pig" tests.

But the cellular telephone industry doesn’t think it’s unethical to use millions of portable cellular owners as "guinea pigs." Their epidemiological study is meant to track the health of 3 million owners. By matching owners

with phone bill information and medical information, the CTIA's Science Advisory Group (WTR) tells us, they will have an epidemiological study that concludes how great the effects of portable cellular telephone use are. What it appears they are really doing is spying on 3 million customers for a number of years to see how their product affects the users' health. That work was supposed to he done in advance of sales instead of spying on people to learn which users die, become mentally deficient, become disabled, or are involved in traffic accidents.

10

Many of the problems of the industry could have been avoided had the influences of the scientific researchers superseded those of the product marketers. But the industry chose to ignore researchers who were providing unfavorable answers. The industry instead organized a broad and comprehensive public relations campaign to persuade users of portable cellular telephones that the operation was safe. The cellular telephone industry engaged in the business of preaching a "belief system."

Never mind that the most current research findings report DNA damage to brain tissue as a result of exposure to radiofrequency radiation.

Never mind that recent conferences, sponsored by the cellular telephone industry manufacturers and service providers, were dominated by reports of research findings that show that most of the energy radiating from the portable cell phones is absorbed in a small region of the user's brain.

The CTIA representatives tell industry insiders that a scientists are very dangerous and if the scientific process

is used the scientists would come back with more questions than answers, which is very risky. This information comes as part of a series of CTIA seminars held to teach cellular industry people how to wage the public relations battle for the minds of the public. This is termed research by press release or research by public relations instead of good old-fashioned scientific research. Of course, research by press release is more predictable than the laboratory research, which could provide embarrassing evidence of biological hazards.

However, owners of portable cellular telephones are now warned that if they are concerned about the radiation then they should limit their use to the shortest time possible and completely avoid use except for emergency situations. Is it possible that by now even the manufacturers of these "high-tech" wonder devices and their association spokesmen are prepared to admit that they may have unleashed the next unseen plague on humanity? Probably not—there are still too many executives and managers looking for their next promotion and continuing their long careers.

The cellular telephone industry is the observer, or spectator, at a game. The game includes about 200 million participants. It is nothing less than cellular telephone Russian roulette. The only difference is that with regular Russian roulette the results are immediate. You know immediately if you're a loser or not. With the cellular telephone Russian roulette you may not know for years if you are the loser. You may not know of a brain tumor until five or ten years after the day you "lost" at the game.

You pick up the phone, once, twice, ten times a day—or only a few times a month. But each and every

time you're gambling that "this time" won't be the occasion when the radiation causes irreparable damage to your brain. It only takes a seemingly small trauma at a very small location to result in tissue damage, DNA damage, or chromosome mutations.

This nonscientific industry experiment using the general population is unique in the history of humanity. Never before has such a large "guinea pig" experiment been performed. Even the government experiments with nuclear radiation only exposed a few thousand uninformed people. This bold experiment may expose virtually the entire segment of the population that can afford to operate the high-tech portables.

It is cellular telephone Russian roulette. Go ahead and make the call. Do you feel lucky today?

$12.95

They are everywhere, but should they be? While most consumers assume that cellular phones have been thoroughly tested and proven safe, that is not the case. Since the 1950s studies have evidenced possible brain damage through radiation emitted by the phones.

However, the industry battle to sell this product has been successful in circumventing, to a large extent, the type of regulation that affects such industries as cars and drugs. The author suggests that "Rather than the benign technology the industry claims, the evidence continues to paint a malignant picture of the effects to be expected due to human exposure to radiofrequency radiation." Sound unbelievable? *Cellular Telephone Russian Roulette*, by Robert C. Kane, reviews and analyzes the research base extensively, and the news is not good.

An eye-opening report, this volume should receive widespread attention.

"[T]issue destruction in one's brain may be occurring without the slightest indication that anything is happening. And the damage may be repeated, over and over again, each time the energy exposure takes place."

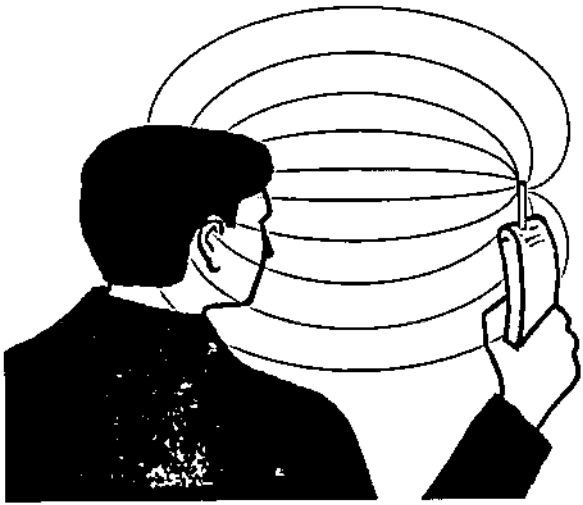
ISBN 0-533-13673-3

9 780533 136735 90000>

Vantage Press, Inc.
516 West 34th St.
New York, N.Y. 10001

Konstantin Meyl

Scalar waves



From an extended vortex and field theory to a technical, biological and historical use of longitudinal waves.

Edition belonging to the lecture and seminar „Electromagnetic Environmental Compatibility"

Preface to the lecture, 1st Edition 1996

The theme encloses the electromagnetic compatibility of both technical and biological systems. Only part of the electromagnetic wave can be considered for function troubles, namely the part that was absorbed and has rolled up to a vortex. The activity depends on the number of created vortices and of their lifetime, their decay.
The eddy current only manifests in conducting materials. In the air and in dielectric materials on the other hand the vortex of the electric field will form, also called the potential vortex. To calculate and to measure this vortex is our goal.

First we'll carry out a survey of the problems and the usual methods. From the analysis of unsolved problems the need for the introduction of the new vortex phenomena is deducted and an adequate field-theoretical approach will be chosen. Afterwards the potential vortices are calculated and their properties are discussed and interpreted.
For the purpose of proving their existence, on the one hand the Schrodinger equation will be derived and on the other hand the quantum properties of the most important elementary particles will be calculated and compared with the well-known measured values. Measurement and calculation are in excellent agreement for weight, charge, magnetic moment and spin. So the theory not only proofs it's correctness, in addition it demonstrates it can achieve much more. The theory takes us to the unification of the well-known interactions and physical phenomena and shows itself as an unified theory.
In the practical conversion and usage of the theory there will not only be informed but by all means also be provoked as an entrance in a fruitfully discussion. Fundamental questions will be taken up like: What is information, energy, temperature or smell? The connection to the theme of the electromagnetic environmental compatibility is formed by the technical and the biological usage of the potential vortices, the energy transmission of Nikola Tesla exactly like the in a similar way functioning nerve conduction. Here we already can expect biological reactions.

This lecture, held for the first time in the winter semester of 1995/96, is available in book form, as an edition belonging to the lecture. This lecture will not deliver ready recipes or instructions. The goal is reached when the critical sense of the listeners and readers has been inspired and discussions have been set going. Everybody has to draw the consequences out of such a theory by him- or herself.
In addition to this lecture a seminar is offered, wherein several themes are supplemented or deepened, different theories are compared and possible consequences are discussed. The appearance of an edition belonging to the seminar has started in 1998<i>.
Regarding the conversion of consequences both politicians and scientists are equally addressed, because the electromagnetic environmental compatibility has developed to one of the most urgent problems of today's world. But in last consequence all of us bury the worldwide responsibility for our environment.

<i>: K. Meyl: Electromagnetic environmental compatibility, Part 2 and 3 of this book, Edition belonging to the seminar.

Table of contents
Page

Preface to the Lecture. 1st Edition 1996 III

Table of contents IV

Part 1 edition belonging to lecture "Electromagnetic environmental compatibility"

1. Introduction 1
1.1 Discussion about limits 3
1.2 Wireless telephones 5
1.3 Absorption of waves 7
1.4 Overlap effect 9

2. Tasks 11
2.1 Tasks of the electromagnetic environmental compatibility 11
2.2 Tasks of the electromagnetic compatibility (EMC) 13
2.3 Declaration of conformity 15
2.4 EMC-techniques to measure the emission of interference 17
2.5 Electro smog 19
2.6 EMC-techniques to measure the stability against interference 21
2.7 Tasks of the biological compatibility 23
2.8 Natural fields 25
2.9 Electricity of the air 27
2.10 Biological effects 29
2.11 Artificial fields 33
2.12 Protection against artificial fields 35
2.13 Unsolved tasks 37

3. Approach 39
3.1 Principle of causality 41
3.2 Field-theoretical approach 43
3.3 Duality 45
3.4 Flow vortices 47
3.5 Rankine vortex 49
3.6 Vortices and anti-vortices 51

4. Properties 53
4.1 Concentration effect 53
4.2 Duality of the vortex properties 55
4.3 Derivation of the electron as an elementary vortex 57
4.4 Quanta as field vortices 59
4.5 The photon 61
4.6 Pair creation 63
4.7 Noise 65
4.8 Condenser losses 67
4.9 Vortex lines and vortex streets 69

Page

4.10 Water colloids as vortex balls ... 71
4.11 Transport phenomenon ... 73

5. Derivation and interpretation ... 75
5.1 Fundamental field equation ... 77
5.2 Mathematical interpretation ... 79
5.3 Physical interpretation ... 81
5.4 Phenomenological interpretation ... 83
5.5 Atomistic interpretation ... 85
5.6 Derivation of the Klein-Gordon equation ... 87
5.7 Derivation of the time dependent Schrodinger equation ... 89
5.8 Derivation of the time independent Schrodinger equation ... 91
5.9 Interpretation of the Schrodinger equation ... 93

6. Theory of objectivity ... 95
6.1 Proof ... 95
6.2 Law of conservation of energy ... 97
6.3 Radius of the electron ... 99
6.4 Maxwell's field equations ... 101
6.5 Transformation equations ... 103
6.6 Field overlap ... 105
6.7 Field dependent curvature of space ... 107
6.8 Electromagnetic interaction ... 109
6.9 Gravitation ... 111
6.10 Field dependent speed of light ... 113
6.11 Universality ... 115
6.12 Aether ... 117
6.13 Spin and tunnel effect ... 119
6.14 Interpretation of the measured faster than light speed ... 121
6.15 Definition of the speed of light ... 123
6.16 Relativity and objectivity ... 125
6.17 Transformation ... 127
6.18 Transformation table ... 129
6.19 Interpretation of the transformation table ... 131
6.20 Particle decay ... 133

7. Proof ... 135
7.1 Elementary vortices ... 137
7.2 Matter and anti-matter ... 139
7.3 Positronium ... 141
7.4 Dipole moment ... 143
7.5 Myon ... 145
7.6 Calculation of the vortex fields ... 147
7.7 Calculation of the proton ... 149
7.8 Strong interaction ... 151
7.9 Magnetic moment of the proton ... 151

Page

7.10 Structure of the neutron 153
7.11 Calculation of the neutron 155
7.12 beta-decay 157
7.13 "Weak interaction" 159
7.14 Tau particle 161
7.15 Pions 163
7.16 Table of vortices of the Mesons 165
7.17 Table of vortices of the Baryons 167

8. Unified theory 169
8.1 Structure ofthe field theory 171
8.2 Unification of the interactions 173
8.3 Temperature 175
8.4 Heat 177
8.5 Sound 179
8.6 Basic principle of cybernetics 181
8.7 Structure of adaptive regulatory circuits 183
8.8 Information 185
8.9 Philosophy of nature 187

9. Usage 189
9.1 Longitudinal electromagnetic waves 191
9.2 Medical technical usage 193
9.3 Flying objects 195
9.4 Electro gravitation? 197
9.5 Free energy? 199
9.6 Nerve conduction and action potential 201
9.7 Wireless energy transmission technology 203
9.8 Measuring and switching technique of Nikola Tesla 205
9.9 Energy technical usage 207
9.10 Environmental compatibility 209
9.11 Ecologically fairusage 211
9.12 Claims concerning the environmental compatibility 213
9.13 Epilogue belonging to the lecture (part 1) 215
Abstract belonging to scalar waves, part 1 218

Page

Part 2, edition belonging to the energy technical seminar 219

10.0 Preface to the seminar, part 2 220
10. Oscillating interaction 221
10.1 Kepler's laws 221
10.2 Unknown interaction 223
10.3 Harmony of the alternating current engineers 225
10.4 Four fundamental interactions 227
10.5 Resonating interaction 229

11. The growing globe 231
11.1 Long-distance effect of the neutrinos 231
11.2 Model of expansion 233
11.3 Ancient Egyptian legend of Genesis 235
11.4 Inner structure of the earth 237
11.5 Earth's core as a converter of neutrinos 239
11.6 Speed of growth 241
11.7 Conservation of angular momentum 243
11.8 Set of difficulties concerning the change of magnetization 245
11.9 The weakly damped moon 247
11.10 Calculation of celestial mechanics 249
11.11 The biblical age 251

12. New cosmology 253
12.1 Concerning the formation of our solar system 253
12.2 The birth of the planets 255
12.3 The derivation of the Titius-Bode law 257
12.4 The hollow planet 259
12.5 Concerning the formation of the universe 261
12.6 Counter examples concerning the 2nd law of thermodynamics 263
12.7 Entropy destroying potential vortices 265

13. Recording of space and time 267
13.1 The measuring technical debacle 269
13.2 The clock paradox 271
13.3 The Tamarack mines experiment 273
13.4 Field dependent linear measure 275
13.5 Experiences from space travel 277
13.6 Spherical aberration 279
13.7 Step by step understanding of the measuring technique 281
13.8 Discussion of the cosmological insights 283

14. The way towards free energy 285
14.1 The liberalization of the energy markets 285

Page

14.2 The consequences of the liberalization 287
14.3 The chances of the wind energy 289
14.4 The chances of being self-sufficient concerning energy 289
14.5 The space energy technology of nature 291
14.6 The gap in the energy balance of man....293
14.7 Carl Freiherr von Reichenbach 293
14.8 Cold fusion and Genesis 295
14.9 Photosynthesis 297
14.10 How nature materializes 299
14.11 Lightning 301
14.12 Ball-lightning....303
14.13 Discussion concerning the neutrino conversion....305

15. Principle of funtioning of space energy 307
15.1 The course of the field lines 307
15.2 Gravitation....309
15.3 Systematizing the interactions 311
15.4 Magnetic force converter....313
15.5 The railgun 315
15.6 Unipolar induction....317
15.7 Tendency to instability 319
15.8 Unipolar field configuration 321
15.9 The Testatika 323
15.10 The secret of the Testatika....325
15.11 The key to free energy 327

16. Space energy technology (SET)....329
16.1 The unipolar generator 329
16.2 Derivation of Maxwell's field equations....331
16.3 SET-devices with rotating magnetic fields....333
16.4 Commentary concerning magnetic SET-devices....335
16.5 RQM and the space quanta manipulator....337
16.6 SET-devices with pulsed magnetic fields....339
16.7 SET-devices with Mobius winding 341
16.8 Mobius converter of Seike and Coler 343
16.9 Tesla's flat coil 345
16.10 The secret of the flat coil 347
16.11 Discussion concerning the technology of the neutrino collectors 349

17. Technical use of the weak interaction __ 351
17.1 Radioactivity caused by neutrinos....351
17.2 Nikola Tesla, the discoverer of the neutrino radiation 353
17.3 Transmutation and reduction of radioactivity 355
17.4 The Patterson Power Cell 357
17.5 Report concerning the cold fusion....359
17.6 Water-Fuel-Cell technology 361
17.7 Unconventional electrolysis 363

Page

17.8 Materialization of neutrinos ... 365
17.9 Oscillation of size and luminescence ... 367
17.10 Phosphorescence and sonoluminescence ... 369
17.11 Discussion concerning the use of the weak interaction ... 371

18. Physical phenomena ... 373
18.1 Water as a catalytic converter for neutrinos ... 373
18.2 Background and zero point radiation ... 375
18.3 The Casimir effect ... 377
18.4 Effects under high tension ... 379
18.5 Flying discs ... 381
18.6 Propulsion with neutrinos ... 383
18.7 Antigravitation or levitation ... 385
18.8 Discussion concerning the effect of closed field lines ... 387
18.9 Concerning the determination of the stand of today's energy technique ... 389

19. Own experiments ... 391
19.1 Concerning the rating of experimental physics ... 391
19.2 The charge amplifier from the workshop of handicrafts ... 393
19.3 Interpretation of the observations with the charge amplifier ... 395
19.4 High-tension experiments in the laboratory for performance electronics ... 397
19.5 Measurement of dielectric capacitor losses in the HF laboratory ... 399
19.6 Analysis of the measured capacitor losses ... 401
19.7 Microwave oven for testing in the laboratory of electrical engineering ... 401
19.8 Microwave heating by decay of vortices ... 403
19.9 The Tesla coil from the workshop of handicrafts ... 405
19.10 Biological effectiveness of the Tesla coil ... 407
19.11 Wrestling for measuring technical insight in the Transfer Centre ... 409
19.12 Neutrinolysis, the alternative splitting of water ... 411

20. Cosmic experiments ... 413
20.1 Millions of voluntary test subjects at 11 August 1999 ... 413
20.2 Model of calculation for the cosmic experiment ... 415
20.3 Physical technical consequences ... 417
20.4 Biological consequences ... 419
20.5 Epilogue to 11 August 1999 ... 421
20.6 Dropping of the neutrino radiation ... 423
20.7 Analysis and comparison of the occurrences ... 425
20.8 Radioactive decontamination with the help of a supernova ... 427
20.9 Free energy from the Orion constellation ... 429
20.10 Interaction of the neutrinos with the core of the earth ... 431
20.11 Changing of polarity and apocalypse ... 433
20.12 Scalar wave gauges for the prediction of earthquakes ... 435
20.13 Calculation of future occurrences ... 437
20.14 Epilogue belonging to the energy technical seminar (part 2) ... 439
Abstract belonging to scalar waves, part 2 ... 442

Page

Part 3, edition belonging to the information technical seminar 443

21.0 Prefaces to the seminar, part 3 444

21. Derivation of the scalar wave 447
21.1 Lord Kelvin in a delicate mission 449
21.2 Helmholtzian ring-like vortices in the aether 451
21.3 Taking apart of the wave equation 453
21.4 Derivation of the scalar wave equation 455
21.5 Derivation of a plasma wave 457
21.6 Mistakes of the HF technology 459
21.7 Coupling of the wave parts 461
21.8 Set of difficulties of the near-field 463
21.9 Transition to the far-field 465
21.10 Scalar wave model 467
21.11 Double-frequent oscillation of size 469
21.12 Electric and magnetic scalar wave 471

22. Properties of scalar waves 473
22.1 Wave-particle compromise 473
22.2 Concerning the measurement of light 475
22.3 Comparison of the parts of Tesla and Hertz 477
22.4 Noise, a scalar wave phenomenon 479
22.5 Neutrino radiation 481
22.6 Parallel instead of serial image transmission 483
22.7 Comparison of the properties 485

23. Research of scalar waves 487
23.1 Frequency diagram 487
23.2 The reverse of the HF medal 489
23.3 Radiesthesia 491
23.4 Prediction of earthquakes with the help of scalar waves 493
23.5 Searching water with the help of scalar waves 495
23.6 Receiving scalar waves with the Lecher antenna 497
23.7 Assignment according to wavelength 499

24. Medicine of oscillation 501
24.1 Mediation of information with the help of scalar waves 501
24.2 Systems with positive feedback 503
24.2.1 The Synchrometer 503
24.2.2 The sound therapy 503
24.2.3 The colour therapy 505
24.2.4 The aromatherapy 505
24.2.5 The gem therapy 505
24.2.6 Meditation and self-therapy 505

Page

24.3 Systems with negative feedback 507
24.3.1 The homeopathy 507
24.3.2 The bioresonance 507
24.3.3 The frequency therapy 509
24.4 The Zapper 511
24.5 Discussion concerning the medicine of oscillation 513

25. Contributions to the discussion concerning the information technical use 515
25.1 Window of the sensuous perception 515
25.2 The sense organs (nose, eye, tongue) 517
25.3 The nerve conduction 519
25.4 The brain, a scalar wave computer 521
25.5 Concerning signal engineering 523
25.6 Stability against interference and repair mechanisms 525
25.7 The microwave window 527
25.8 Discussion concerning scalar wave medicine 529

26. Recapitulation from the viewpoint of textbook physics 531
26.1 Common misinterpretation of the antenna losses 531
26.2 Wave damping by field vortices 533
26.3 Laplace versus Maxwell 535
26.4 Error term in the wave equation 537
26.5 Interim result 539
26.6 Failure of the Maxwell theory 541
26.7 Concerning the evidence situation 543

27. Faraday versus Maxwell 545
27.1 Energy out of the field 545
27.2 Vortex and anti-vortex 547
27.3 Vortices in the microcosm and macrocosm 549
27.4 Faraday's law and Maxwell's formulation 551
27.5 The discovery of Faraday 553
27.6 Different formulation of the law of induction 555
27.7 Contradictory opinions in textbooks 557
27.8 The field-theoretical approach 559
27.9 Derivation of Maxwell's field equations 559
27.10 Derivation of the potential vortices 563
27.11 Derivation of the fundamental field equation" 565
27.12 The Maxwell field as a derived special case 567
27.13 Derivation of the wave equation 569
27.14 The new field approach in synopsis 571

28. Objectivity versus relativity 573
28.1 The question concerning the aether 573
28.2 Vortices, an overlap of the overlap 575
28.3 Field overlap 577

Page

28.4 The derivation of the length contraction ... 579
28.5 The dependence of the Lorentz contraction on the field ... 581
28.6 Boscovich and the respiration of the Earth ... 583
28.7 Derivation of the gravitation ... 585
28.8 From subjectivity to objectivity ... 587
28.9 The objective standpoint ... 589

29 Mathematical gleanings ... 591
29.1 General and special theory of relativity ... 591
29.2 Transformation table ... 593
29.3 Discussion concerning the root of Lorentz ... 595
29.4 Mathematical derivation of the neutrino ... 597
29.5 Universal constants and constants of nature ... 599
29.6 The fundamental number e ... 601
29.7 The pentacle ... 603
29.8 The vortex, which is rolling up ... 605
29.9 The Golden Proportion ... 607

30. Scalar wave technology in antiquity ... 609
30.1 Thesis ... 609
30.2 Prerequisites ... 611
30.3 Approach ... 613
30.4 Circumstantial evidence ... 615
30.5 Radio technical concepts ... 617
30.6 Wireless telegraphy ... 619
30.7 AM temple technology ... 621
30.8 Modulation of acoustic signals ... 623
30.9 Broadband FM broadcasting technology ... 625

30.10 Epilogue ... 627

Contacting address and information ... 634

Table of formula symbols ... 635

References ... 636
A: Publications concerning the theory of objectivity (primary literature) ... 637
B: Publications about the theory of objectivity (secondary literature) ... 641
C: Literature concerning physics in general ... 643
D: Literature concerning geophysics, geology, geography and astronomy ... 644
E: Literature concerning the EMC and biological compatibility ... 644
F: Literature concerning Tesla and criticism of textbook physics ... 644
G: Literature concerning free energy ... 645
H: Literature concerning medicine, biology and chemistry ... 646
J: Literature concerning history and more peripheral subjects ... 646

Appendix ... 647

1. Introduction

Here the extremely controversially discussed question of the environmental compatibility of electromagnetic fields will be persuaded. Limits should inform what is incompatible and what is compatible. But there are as many limits as there are commissions and specialists. And besides that differ the results from each other for several powers of ten. In course of time the legitimate doubts become unmistakable and the representatives of science slowly get to feel the burden of proof.
For the sake of efficiency, the actual discussion concerning the theme of electro-smog is analysed and the necessity to involve an until now unnoticed field phenomenon in the discussion about limits is derived: It concerns vortices of the electric field. These potential vortices, as they are called, have the corresponding properties to show biological effects even at the lowest field strengths. In any case it is not possible to exclude that at present the wrong physical phenomena are measured and made responsible.

A parable should bring clarity.
Lets imagine that the to us well-known and over our sense of touch understandable physical phenomenon of the temperature is unknown to us, neither measurable nor perceptible. Our weather station only exists of a barometer that could show us the air pressure and deliver us indications if good or bad weather is to be feared. We ready realize that there exists a connection between the air pressure and our health and make the to us well-known phenomenon responsible. When the pointer points to good weather we can go out lightly dressed. With bad weather we should take a coat, so we know from experience.
"Now we imagine the realistic situation that in winter we have a weather situation of high pressure but it's stone-cold outside. The weather station will display high temperatures with the result that some people will walk around with short-sleeved and open shirt, only to lie in bed with a cold in the evening. Of course the air pressure was to blame! Logically the "pressure sensitive", as they are called mocking, demand the limits for the allowed pressure to be reduced so far that no consequences for health are to be feared. Concerning the theme of allowed limits, science is asked and science proceeds in a systematic way: the pressure is investigated in the laboratory, isolated from all other parameters and so it is discovered that man catches no cold even at a substantially higher air pressure, so there is no reason to alter the limits.
Actually we would expect these at any time reproducible results to have a calming effect on the minds of the participants of the discussion and on the population. Instead the pressure sensitives time and again cite new knowledge that won't fit in the scheme. So is for instance stated that draught causes the same health problems although this pseudo effect has nothing at all to do with the air pressure. So owing to incomprehensibility and emotions the discussion about limits becomes a farce.

The fact that sensitive people react to effects of air electricity and possibly get ill without proof that some today measurable physical quantities are responsible should make us think. It is little calming watching our scientists poking at the dense fog whereas at the same time among the runners of the new telecommunication networks there spreads something like a gold-digger mood.
To introduce a new technology is not difficult, but to abolish it for reasons of the electromagnetic environmental compatibility is almost impossible!

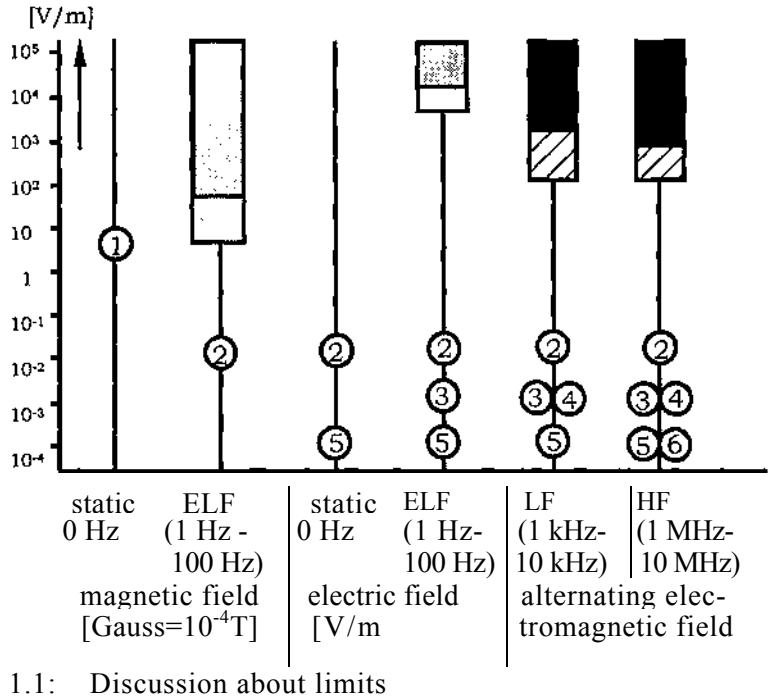


Fig. 1.1: Discussion about limits

Limits for professional exposition (electronics engineers) and
Limits for non-professional exposition (population in general) according to the Recommendation of IRPA/INIRC<ii>.
Limits according to VDE 0848 / 1989
Limits according to VDE 0848 / 1992
experimentally determined threshold values of reactions of biological systems <i>:

1 Increase of the activity of movement of birds
2 deflection of divining-rods
3 influence on the time of reaction of men
4 conditional reflexes of fish without electrical organs
5 conditional reflexes of fish with electrical organs
6 conditional muscular reflexes of men

taken from:
<i>: H.L. Konig: Unsichtbare Umwelt (Wetterfuhligk.), 5. Aufl., Bild 111, S. 123 Verlag Moos & Partner Munchen, ISBN 3-89164-O58-7
<ii>: Habiger u.a., EMV, Verlag Technik, Berlin 1992, S. 152

1.1 Discussion about limits

Whoever follows the public discussions concerning electro smog always sees two arguing parties, whose standpoints lie so far apart that they inevitably talk at cross purposes and there can be found no consensus.

On one side the "affected" find together who maintain to have found the electromagnetic radiation as the damaging cause for their problems. They are to be taken serious, even when only their personal sensitivity serves as means of measurement and proof and a more or less distinct sensitivity against electromagnetic phenomena. This group occasionally finds support of homeopaths who can base on reproducible laboratory results that fit as few into the view of life of science as the empirical statements of affected and possibly hurt people.
On the other side stand the representatives of the energy-supply companies and the runners of radio networks who argue with the needs of our modern industrial society and give "limits" prescribed to them by scientists. These, for their part, proceed according to strictly scientific methods. Their presented results are reproducible and there's no doubt about them.
The limits after all are fixed far below those that are recommended from a scientific viewpoint. Nevertheless both groups are separated from consensus by powers of ten. When we want to know how deep the ditch is we want to bridge, we should take a look at the determined limits (Fig. 1.1).

The limits stem from the 1RPA (International Radiation Protection Association) an organ of the World Health Organization that in turn has appointed the INIRC (International Non Ionizing Radiation Committee). These now state to have used all available scientific research results as basis for the given guidelines.
Moreover a safety range was worked into them. So the limits were fixed at substantially lower levels to guarantee that no health damage arises. In this way first the limits were determined for the people who for reasons of profession are exposed to electromagnetic fields.
For the population in general the limits for the so called non-professional exposition were reduced further to one half till one fifth for reasons of caution and care. In Fig. 1.1 these limits are registered. Thereby is distinguished between magnetic fields and electric fields that appear stationary or at extremely low frequencies (ELF describes frequencies between 1 Hz and 100 Hz). Moreover limits for low-frequency (1-10 kHz) and high-frequency (1-10 MHz) alternating electromagnetic fields are given.
The graph should serve as a rough orientation and show us the proportion of scale. As further information some thresholds of measured reactions of biological systems are registered (after Konig*[1]*). Because a logarithmic scale was chosen to fit all the values on one graph it becomes clear that between the first reactions and the recommended limits there lie up to five powers often. The ditch seems to be insurmountable.

Fig. 1.2: Set of problems of environmental compatibility by means of the example of the handheld wireless telephones (handy).

<i>: L.v.Klitzing: Neurophysiologische Einflusse durch elektromagnetische Felder wahrend und nach der Exposition, Med. Universitat zu Lubeck

1.2 Wireless telephones

Measuring technical surveys with regard to the influence of brain currents by digital radio signals by the university hospital in Lubeck have startled handy manufacturers and users equally <1>. Although in this case measurement errors could be detected, the ,,bugaboo on the wall" remains that we are sitting unsuspecting in a restaurant and a neighbour draws his handy out of his pocket to make a digital telephone call. Thereby synchronizing the brain currents within a radius of 100 meters on the broadcasting signal and occupying our brain useless with technical signals. The derivation will show that from the start this can't happen to all visitors, because as a prerequisite conditions of resonance must be fulfilled. But would there be an affected, he or she for sure would have considerable problems, because informations that are not picked up over the sense organs can neither be classified timely nor as regards content.
An affected whose brain has picked up technical signals not even is able to register by itself that it was fed with incorrect informations. It would be reasonable when the visitors of the restaurant would defend themselves and put the radio operator on the doorstep. The number of restaurants where apart from cats and dogs also handy's have to stay outside is increasing. How should we keep out of the way of electromagnetic fields? Should we walk around permanently with a steel helmet or even better in a knight's armour and even go to bed with them? It would be worse than in the dark middle ages.

Summarizing: it should be guaranteed that the operation of electro technical apparatus causes neither health damage nor unintentional influence or irritation. A systematic and scientific procedure should investigate in the laboratory all relevant physical phenomena individually for their interaction. Electro physics bases on two phenomena in connexion with electro-smog: on the one hand the radiation and on the other hand the thermal effect, but at a close look both factors prove to be of only little importance!
In radiation measurements the intensity of the electromagnetic wave at a certain place is determined. In laboratory experiments the field strength is increased so long till biological reactions are observed. Thermal limits are determined in a similar way. As said, the values lie about powers of ten above those that possibly bother you when you hold a handy to your ear. It is true that the microwave radiation penetrates into your head but we also know that it marches out again on the other side and this visit in your head happens with the speed of light.
Exactly like this are guest in your body constantly your local radio station, your local television station the satellites with hundreds of programs and anyway the whole radio technical world even when you did not invite them.
For an electromagnetic wave to become receivable, the field strength must lie clearly above the common noise signal and this can only be achieved by a permanent overlap, by standing waves, like in a cavity tuned to a specific frequency or an antenna. As long as people don't let themselves grow antennas on their heads they hardly have to fear direct biological effects of electromagnetic waves.
That leaves as the second phenomenon the thermal effect. With a handy held to your cheek there comes into being a local fever in your head. But that is not at all unusual or unnatural for the human body. Something like that happens to a far greater degree when you take a hot foot bath or let yourself be irradiated at one side from the sun at a tourist grill.

Power of waves:

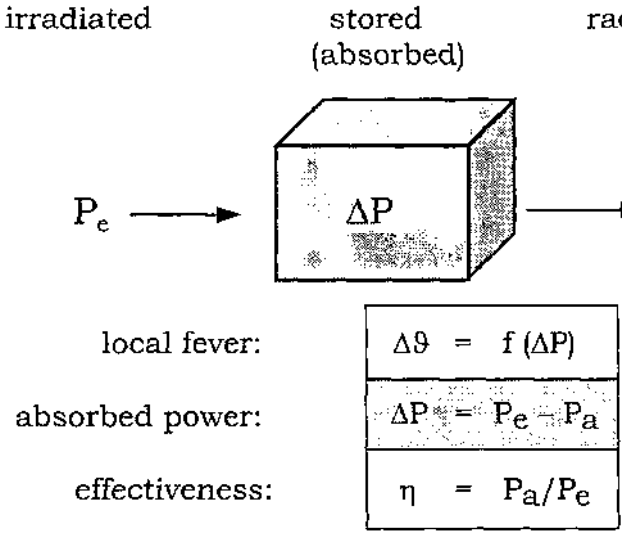


Fig. 1.3: Damping of waves and ability to absorb of a body
(our head) if we are making a phone call with a handy.

---

a contribution to the theme dielectric losses

- capacitor
- high-frequency welding
- microwave oven

<i>: K. Meyl: Potentialwirbel Band 1 [A1] (only in German),
INDEL Verlag, Villingen-Schwenningen 1990, ISBN 3-9802 542-1-6
<ii>: K. Meyl: Potentialwirbel Band 2 [A2] (out of print),
INDEL Verlag, Villingen-Schwenningen 1992, ISBN 3-9802 542-2-4

1.3 Absorption of waves

The with the theme dealing physicians logically have to put up with criticism that they work only with two phenomena that not at all can be involved authoritative in the causes for biological effects. A third factor can be considered, a field phenomenon until now stayed unnoticed by science: the vortex of the electric field, the so called potential vortex. A vortex is to be considered as an oscillation around a fixed point. Through that a permanent overlap is caused, like what happens at an antenna only that the vortex is not bound to the dimension of an antenna. The potential vortex is contracting and in this way reaches extremely high energy densities at very little spatial measurement, densities that lie far above those that field strength measurements are pretending to us [Al]<i:>.

When again you take the handy at hand with which you „blow" the pulsed microwaves into your head. Don't worry, because with the speed of light and without provable damage almost everything comes out again on the other side, but only almost everything. A little damping of the wave has taken place and your head has absorbed this part of the irradiated wave (Fig. 1.3). Who claims this is already the thermal factor actually should realize that there exists no corresponding term in the wave equation. Here there are found merely two dual vortex phenomena as a possible damping term: the eddy current and the potential vortex. An eddy current damping is ruled out because of the bad conductivity of the head. But this favours his dual anti-vortex, the potential vortex [A1]<i>.

Seen physically the following is taking place in your head: the absorbed waves roll themselves up to vortices and through that become localized and overlap themselves permanently (Fig. 1.4b). In the course of time the vortices decay and produce the well-known eddy losses that lead to the measurable increase in temperature. When reactions or biological effects arise, simply and solely the vortex can be considered as the possible cause. Thereby play two points an important role: the number of the generated vortices and their lifetime that is determined by the time of decay.

In anticipation of the mathematical calculation of the potential vortices it is pointed out here that these are favoured not only by a low conductivity, but also by a high dielectricity. Because water has an unusual high dielectricity (ε_r = 80) and our head consists predominantly of water doubts in dealing with handy's are reasonable.

Also the relaxation time constant representative for the lifetime can be calculated [A2]<ii>. We must proceed from the assumption that both the number of the vortices and their lifetime, that is all the at a fixed point in time in our head existing and effective vortices, can be a cause and therefore have to be considered and investigated scientifically.

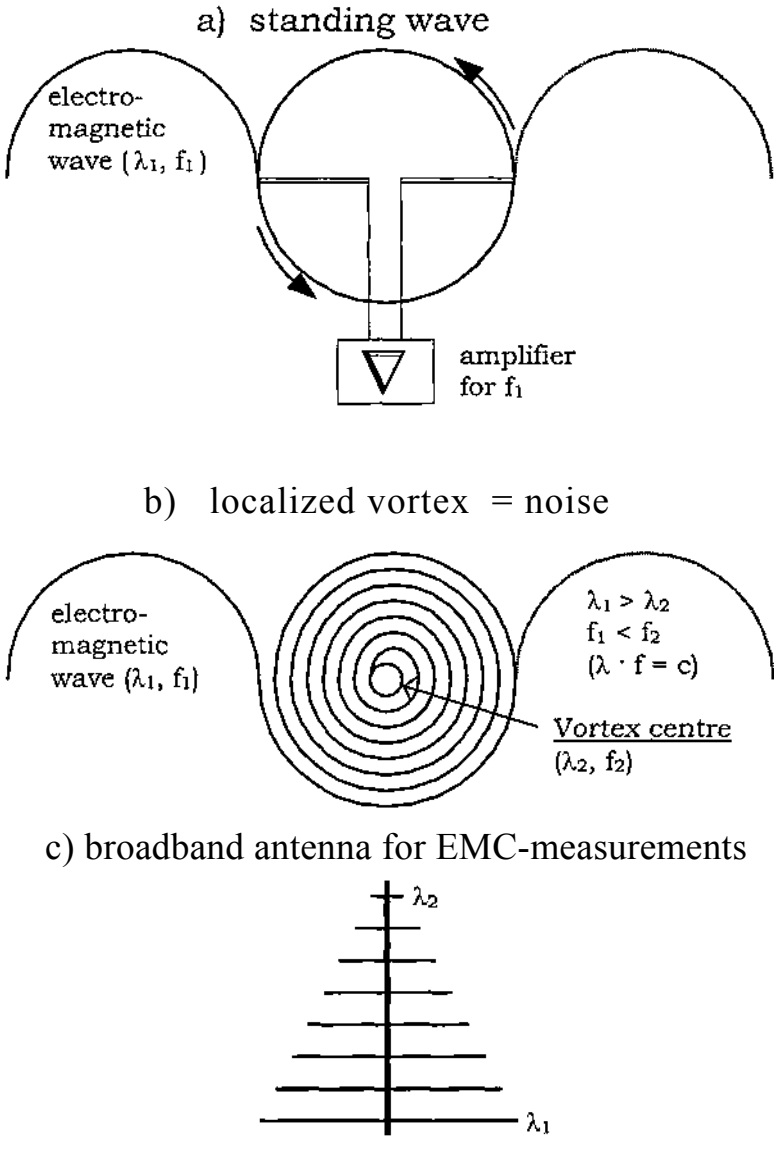


Fig. 1.4: Measurement of localized waves and vortices

1.4 Overlap effect

The graph at the left (Fig. 1.4) should clarify once more that only the in space localized and permanently overlapping field appearances can be considered as a cause for biological effects. This can concern an over an antenna standing wave (a) or a vortex (b) which is to be taken as localized by nature.
It would be allowed to in general speak only of a vortex because the standing wave can by all means be understood as a special case of the vortex. The essential difference is that the vortex is not bound to the size of a fixed antenna and can contract itself at any time to achieve in this way a substantial higher energy density. As a result this than will lead to an increased biological effectiveness.

It should be pointed at a further omission. In the discussion about limits, without exception, the absolute field strength of the broadcasting signal is valued and not the type of modulation. The last mentioned should actually not at all play a role according to the prevailing scientific opinion.
Totally different is the case with a vortex that acts damping. Such a vortex shows near it's centre a considerable smaller wavelength than more to the outside and through that it has a big frequency bandwidth [A5]<i>. It is to be expected that in the extremely broadband pulsed signals of the digital networks the creation of vortices (or eddies) will be favoured considerably stronger than in amplitude- or frequency-modulated signals (AM/FM/C-network). In connexion with analog modulated radio- or handy-signals until now there never has been reported of any synchronization of the brain currents with handy-signals from a comparison of the EEG with the broadcasting signal.

Interestingly the for EMC-measurements usual stepped broadband antennas have exactly the construction that certainly would be favourable to the measuring technical registration of vortex phenomena (Fig. 1.4c).
With the dipole antennas of different lengths for different wavelengths there still are measured waves and not vortices but these measuring techniques is certainly accommodating to the until now unnoticed and stayed undiscovered vortex phenomenon. So there are some good reasons that the vortex is a dominating influential factor for EMC-problems.

By means of the example of the handheld wireless telephones can be studied and discussed with which set of problems the very young discipline of science of the environmental compatibility has to fight in the future. And in which ways there can be found approaches towards a solution of the problem. When the comfortable and trodden out ways of textbook physics do not lead to the goal than we will have to force our own way through the jungle of science.
At first we'll have to obtain a short overview of the actual level of research and knowledge. From the criticism to this we than can derive the tasks of the electromagnetic environmental compatibility and in particular the unsolved tasks.

<i>: K. Meyl: Wirbel des elektrischen Feldes, eine neue Storquelle? EMC Journal 1/95, 6. J, S. 56-59.

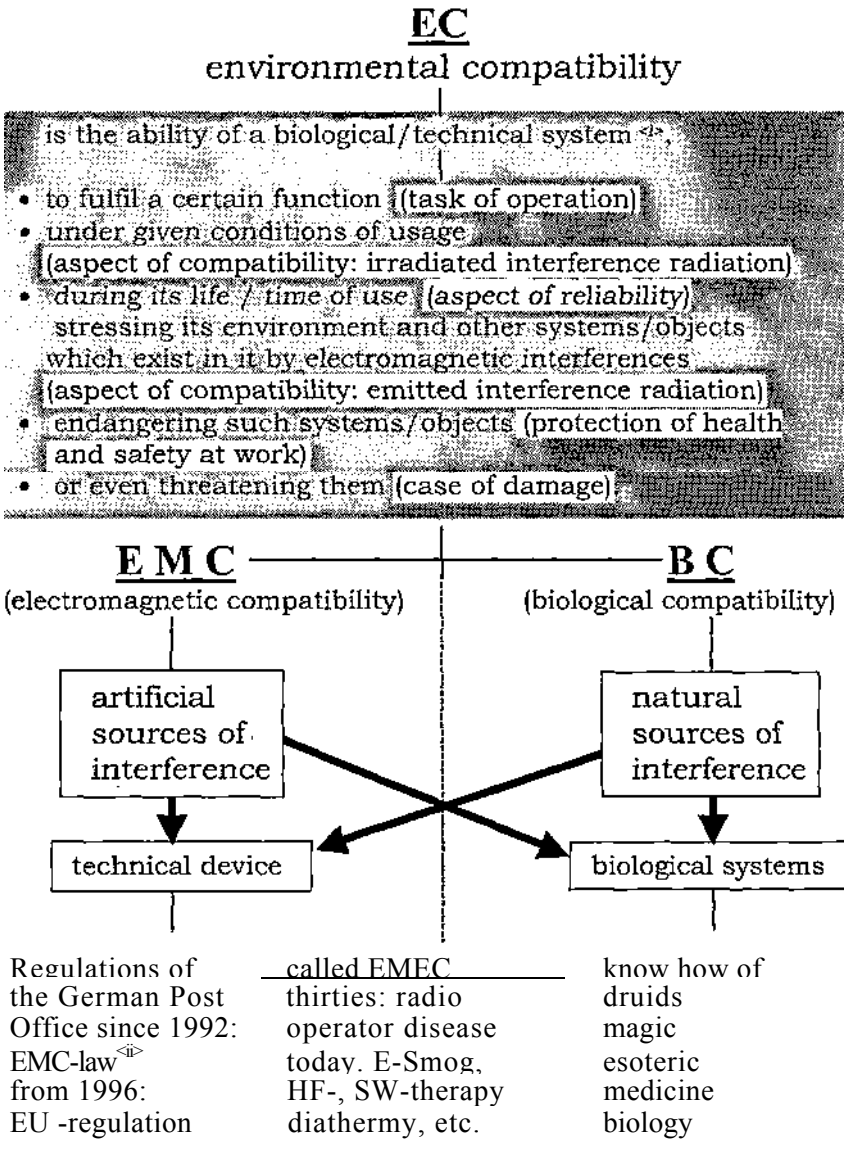

EC
environmental compatibility
is the ability of a biological/technical system <i>,
• to fulfil a certain function (task of operation)
• under given conditions of usage
(aspect of compatibility: irradiated interference radiation)
• during its life / time of use (aspect of reliability)
stressing its environment and other systems/objects
which exist in it by electromagnetic interferences
(aspect of compatibility: emitted interference radiation)
• endangering such systems/objects (protection of health
and safety at work)
• or even threatening them (case of damage).
EMC
(electromagnetic compatibility)
BC
(biological compatibility)
artificial sources of interference
natural sources of interference
technical device
biological systems
Regulations of the German Post Office since 1992: EMC-law<ii> from 1996: EU -regulation
called EMEC thirties: radio operator disease today. E-Smog, HF-, SW-therapy diathermy, etc.
know how of druids magic esoteric medicine biology

Fig. 2.1: Overview concerning environmental compatibility

<i>: E. Habiger: EMV-ubergreifende Aspekte zu benachbarten Problemfeldern, Elektrie 48 (1994), Heft 5/6, Seite 163-161

<ii>: EMVG: Gesetz uber die elektromagnetische Vertraglichkeit von Geraten, Bundesgesetzblatt Teil I vom 9.11.1992, S. 1864

2. Tasks

2.1 Tasks of the electromagnetic environmental compatibility

The environmental compatibility (EC) forms the generalization that includes both the electromagnetic compatibility (EMC) and the biological compatibility (BC). Besides the technical and functional goals of an undisturbed functional course it also pursues ethical and moral goals.
Technology should benefit to humanity and at the same time be in accord with nature. This goal will not be reached when this technology directly or indirectly is endangering humanity.
A direct attack on the health of people poses for instance the military usage of technical apparatus or the negligent usage, by pretended ignorance and unsuspicion.
Is a technology posing a danger to the environment so humanity endangers itself indirectly with this technology. After all are human beings a product of their environment. We always should reckon on the environmental sins taking revenge on us sooner or later.

In fig. 2.1 a formal definition is given that in particular concerns the claims for an undisturbed functional course: it concerns the compatibility aspects of unallowed emitted and irradiated interference radiations, the reliability and quality safety with which a function and task is fulfilled and finally the questions of the protection of health and the safety at work.

Moreover fig. 2.1 provides an overview and the structure of the 2nd chapter. First we'll treat the electromagnetic compatibility (EMC) that first of all deals with the influence of artificial but also natural interference sources on technical apparatus.
After that we'll throw a glance at the appearing fields in nature. The biological compatibility (BC) deals with the influence on biological systems.
An especially sensitive area of the environmental compatibility (EC) than describes the with a cross-link hinted influence of artificial interference sources on biological systems that is popularly described as „electro smog".

The numerous aspects of the environmental compatibility for instance in the areas of chemistry and biology that certainly are important, but do not fall in the area of electromagnetism, can't be treated in the here marked framework.

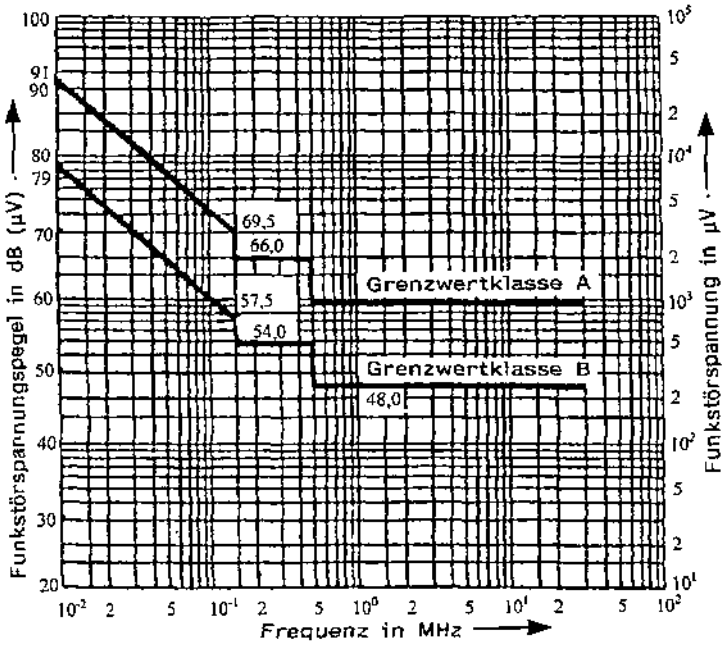


Fig. 2.2: Classes of limits according to VDE 0871 (since 1-1-96: VDE 0875)[<i>]

<i>: Anton Kohling: Grundlagen der Funkentstorung in der Bundesrepublik Deutschland, etz Bd. 108 (1987), Heft 10.

2.2 Tasks of the electromagnetic compatibility (EMC)

First of all the EMC (electromagnetic compatibility) is concerned with the function of technical apparatus. Correspondingly rational and dry sounds the official definition: "electromagnetic compatibility (EMC) describes the ability of an electrical setting-up (i.e. of a construction element, of a construction group, of an apparatus or of an installation) to function in an electromagnetic environment without stressing this environment by electromagnetic effects in an unallowed fashion ".

Actually it concerns an old need for protection that should be as old as the usage of electro technical apparatus. But in the beginning no one cared about it. The spark gaps with which Heinrich Hertz 1888 in Karlsruhe has carried out the first radio technical experiments were genuine ,,polluters", that would have been detectible at several hundreds of kilometres distance with modern receivers. For these installations that he had assembled in the lecture room with his students, today he would hardly get a permission of operation and the since 1996 required declaration of conformity he would get not at all.

1925, as in Germany the number of radio listeners had exceeded the limit of one million, for the first time a need for protection appears in the certificate of approval for radio receivers: "The public telegraphs and telephone installations must not be disturbed by the radio receiver".
Later on every backside of the good old steam radios there was found the following hint (translated): "This apparatus meets the interference radiation regulations of the German Post Office". So the manufacturers were urged to measure the emission of their apparatus and in particular to screen the HF-oscillators in the superhet-receivers.

Since the fifties, in the VDE-institute EMC-examinations in the present day sense are taken. The main point of the measurements and the by the VDE recommended limits, however is about interferences bound to a circuit. On the supply lines of the network the prevailing conditions are reproducible so that standards can be put through (Fig. 2.2).

For measurements of interference radiation maybe the time was not ripe enough or the necessity was not big enough. The usual argumentation was: what we can't measure reproducibly, can not be forbidden and certainly not be put under punishment. Therefore merely recommendations were issued or impositions weak as wax were made like: "the interference field strength ... must be so small that an undisturbed reception is guaranteed as soon as the minimum field strength for utilization exists at the place where the antenna is mounted"<1>.

In common parlance that means something like: "as long as no one bleats, everything is allowed". Within a connected industrial area there even existed an officially legitimized fools freedom. Merely at the fence of the industrial area limits had to be fulfilled.

Specially for the line-frequency of the screen one has decided to build a loophole in the law so that one didn't have to throw the TV sets, that so successfully had conquered the living rooms, out of the window. Of course the flickering screens did interfere exactly as before but this EMC-interference now was officially approved.

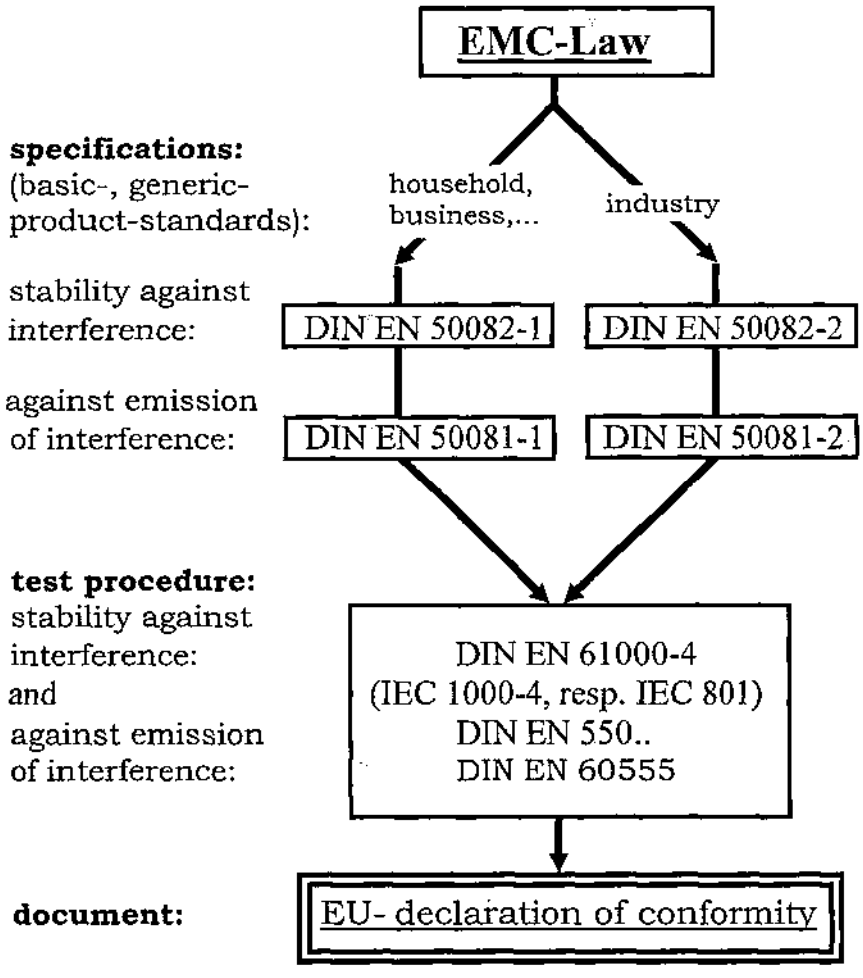
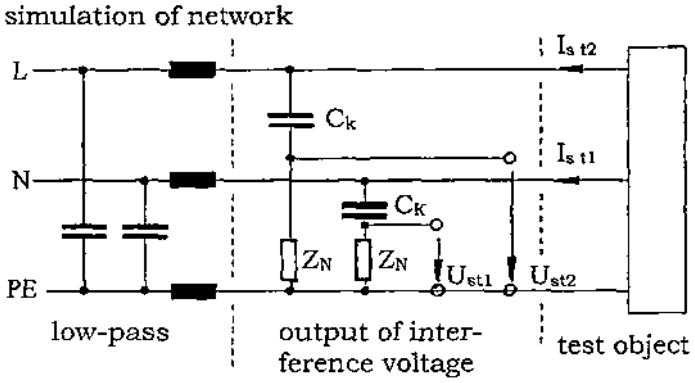


Fig. 2.3: The way to EU conformity

2.3 Declaration of conformity

In the EMC times seem to have gone as the standardizers had to fit in with the insufficiencies of technology. Meanwhile the conditions have turned up. We owe this circumstance first of all the EMC-law of 1992 that doesn't name any limits but it states the political intention to demand from technical apparatus and installations an appropriate stability against interference and at the same time limit the sent out interference. As a consequence of this law the measurement facilities and measurement processes had to be standardized to get reproducible measurement results that are not influenced by the electromagnetic environment. That goes so far that even the floor covering of a measurement hall is dictated because the conductivity of the floor influences the degree of reflexion. Normally the examinee is situated on a revolving plate that is turned around for 360° during the measurement of the radio interference field strength. Is it however not possible to turn the examinee than the antenna has to be led around it, thereby again increasing the dimensions of the measurement hall. The distance to the antenna should be up to 10 meters. Moreover it must be possible to move the antenna, up till a height of 4 meters to register the influence of the reflexions on the floor.
Moreover there is to plan a reflexion free zone around the measurement track (in elliptical form) that depends on the reachable damping of reflexions of the used absorber. Used are pyramids of foam material soaked with carbon and increasingly tiles of ferrite or shieldings of wallpaper.
Taken all together for a measurement hall doing justice to standards there result considerable measurements of for instance 18 m length x 10 m width x 7 m height. Let's again come to talk about the EMC-law with which only the intention but not the way is fixed. To form the claims catalogue in a way that is fulfillable in general, some concrete prescriptions, the so called standards, have to be worked out. This task was transferred to the European committee for electro technical standardization CENELEC, which has established the workgroup TC 110 to at first work out some standards:
The basic standards deal independent of product with general questions of the EMC, of the testing process and of the measurement environment.
The generic standards likewise deal independent of product with the so called fundamental technical standards for apparatus in their dependence of the respective electromagnetic environment (protected computer room or medical room, environment of the house, office or industry).
The product standards concern the EMC-standards referring to products (7 product families / approx. 50 products).
In Fig. 2.3 the arduous way through the jungle of paragraphs for a technical apparatus is outlined. Corresponding to the requirements of use, first the relating ES-standards for the apparatus have to be determined and than have to be measured according to own test standards based on the fundamental technical standards. When the allowed limits for stability against interference and for sending out interferences are not exceeded, the EC-declaration of conformity is handed out. Since 1.1.96 that declaration is needed when apparatus are commercialized or - stated more exactly - "put in circulation" and operated. When still further EC-guidelines are met in the end the CE-hallmark is awarded. Since 1.1.96 only with this hallmark the access to the common market of the EC is possible. Violations can be punished with fines and if need be with imprisonment. But there are great national differences in the EC. The Federal Republic of Germany with fines of up to 50.000 Euro counts as expensive for criminals.

Simulation of network for the measurement of the interference voltages U_{st1} and U_{st2}.



impedance Z_n of the simulation of networks for industry networks in the range of 0.15 to 30 MHz

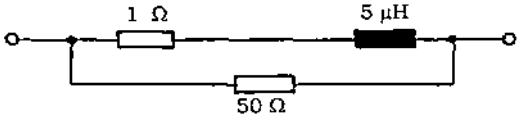


Fig. 2.4: Simulation of network for the measurement of interference voltages.<i>

<i>: acc. to Ernst Habiger: EMV, Huthig Buch Verlag Heidelberg (1992), ISBN 3-7785-2092-X

2.4 EMC-techniques to measure the emission of interference

Actually we already can be glad that it came to an europe-wide agreement for the regulation of the EMC-set of problems. But the question if we can be satisfied with what we have reached is still outstanding. All too often the lowest common denominator of the measurable and checkable was sought and not so much the technical possible was taken into consideration.

The main emphasis is put on the measurement of the emission of interferences. Traditionally the interferences bound to a circuit are registered in a frequency range up to 30 MHz. The corresponding wavelengths thereby can correspond with the length of the supply lines and form standing interference waves. Primarily the spectrum of the interference currents is measured e.g. over a HF-current converter. These currents produce a voltage drop over the internal resistance of the feeding network. Because the properties of the networks can vary very strong, a standardized end-resistor is required for the measurement of the interference voltage. For this purpose an imitation of the network is switched between the network and the examinee. This imitation in addition has the task to keep away the interference signals that come from the supplying network with the help of filter-elements (Fig. 2.4).
The measurement of the interference radiation, the field-bound interference emission, lakes place between 30 MHz and 1 GHz. For that a free field or an absorber-hall with little or no reflexions is required. The standardized distances of measurement are 3, 10 and 30 meters. The electric field strength is determined with dipole broadband antennas, the magnetic field strength with frame antennas. It must be possible to both vary the receiving antenna between horizontal and vertical polarization and to adjust the receiving antenna in the height and the position to the test object.

Typical measurement set up to measure the emission of interferences bound to a conductor[<i>]

A: shielded link conductor
B: bundle of conductors folded like a meander
C: connection to the reference mass
ME: receiver of interference signal
NNB: Simulation of network
PO: test object

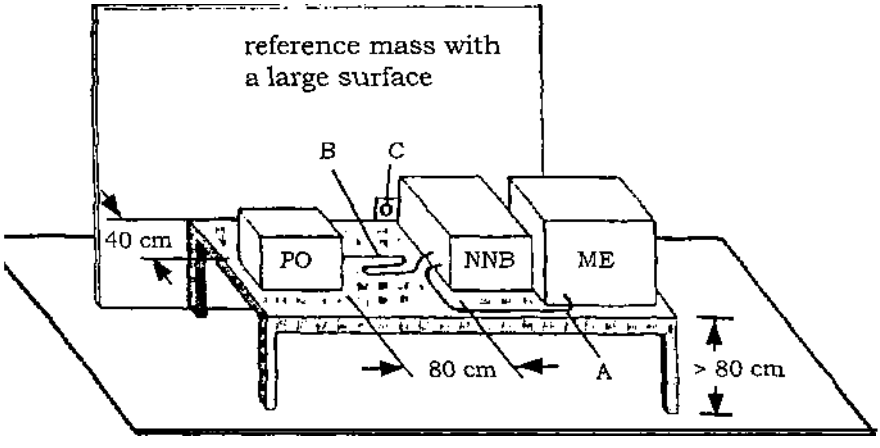


Fig. 2.5: Measurement set up to measure the emission of interferences bound to a conductor,[<i>]

<i>: Ernst Habiger: EMV, Huthig Buch Verlag Heidelberg (1992), ISBN 3-7785-2092-X

2.5 Electro-Smog

There is almost no end to the possibilities of variation and one needs already a lot of overview and experience to determine the field strength maximum. Nevertheless we have to ask ourselves if in this way really all emissions of interference are understandable, that popularly are described as ,,electro smog".

Smog is the combination of the terms Smoke and Fog. It therefore describes a pressure on the environment with fog like smoke. When for instance in the case of smog alarm all interference sources are switched off, which means all kilns are brought to a stop and all automobiles are stopped, than the fog like smoke therefore still is not vanished from the air. It just distributes itself and dissolves only very slowly.

The transfer of the smog idea on the electromagnetic interference radiation is bound to fail because, when the test object is switched off no emission of interference at all is detectable with the usual measurement means. Nevertheless the rainbow-press is trying to enumerate almost all electromagnetic field phenomena under the term ,,electro smog" without consideration of the fact that this term is not at all a collection term. From the sight of an expert one can only speak of smog when something like smog remains and stays active further after the switching off of an electro technical apparatus. It should be a phenomenon that is not understandable by the standardized measurements of interference radiation. Such a phenomenon would be e.g. the vortex of the electric field. However vortices are virtually not measurable in a direct way because they have the unpleasant property to whirl about around the measurement probe. But they will be detectable by their eddy losses and in the case of the electric field vortex appear as noise. Until now the standardizer however haven't planned to investigate the influence of an apparatus on the noise in the environment. Here we still grope in the dark.

At least the vortex shows a storing property that would justify the use of the idea "smog". We'll have to investigate the phenomenon.

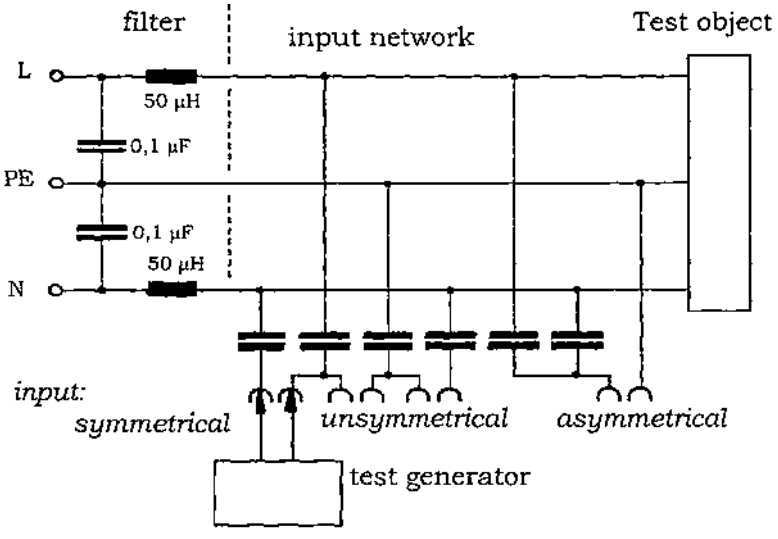


Fig. 2.6: Picking up of interference voltages in network lines.<i>

<i>: Ernst Habiger: EMV, Huthig Buch Verlag Heidelberg (1992), ISBN 3-7785-2092-X

2.6 EMC-techniques to measure the stability against interference

The question is: what kind and what intensity of an electromagnetic interference can an apparatus cope with without limiting it regarding its technical function.
For that test generators are used and with their help interference signals are produced in the test object. Fig. 2.6 shows the possibilities of a symmetrical, of an unsymmetrical and of an asymmetrical production of interference voltage signals in the power supply lines of an examinee. Over and above that the testing possibilities and testing methods are numerous. In principle the following processes are used:

1. The simulation and production of interference factors typical for the network like harmonic waves on network voltages, overlapping signal voltages, changes of network voltage, decrease of network voltage, network interruptions, network unsymmetries and network frequency changes.
2. The production of both energy-poorer and energy-richer interference impulses like they can form in energy-networks by switching acts or by the effect of lightning (burst).
3. The simulation of the course of events when static electricity discharges.
4. Low-frequency magnetic fields like those that can form by network frequency operating and loading currents or by short-circuit and lightning currents in the form of a pulse.
5. The stability against interference against the influence of an electromagnetic field also called radio interference firmness. For this purpose high-frequency generators and broadband antennas are used to expose the examinee to electromagnetic fields in a frequency range between 10 kHz and 18 GHz. At the moment tests are only performed between 27 and 500 MHz. The modulation of the carrier wave should be possible to be able to imitate the interferences by radio technology as realistic as possible. Thereby the field strength values can by all means reach up to several 100 V/m.

In accordance with expectation the result of this irradiation with an outside field is that every conduction path and every wire can act as an antenna and therefore can produce high-frequency currents and measurable potentials. Building parts of the analog technology as a consequence battle with problems of drift whereas with digital logic parts and computer parts the danger exists that switching states change unintentionally. Let us remember again the overlap effect of fig. 1.4. The electromagnetic wave itself marches with the speed of light through the examinee. When a small part of the wave finds an object that it can use as an antenna than the localized overlap comes into play. This than as a cause is responsible for the effective and measurable antenna currents. Until here the text books help us to explain the problems that happen and to remove them logically.

However time and again cases are reported where textbook physics can't help us any further. Spectacular cases even came to court like e.g. the ABS (Antilock Braking System) of a truck that had failed due to EMC-interference radiation. As a consequence the brakes had failed. When after that the local radiation pollution is measured no anomaly at all can be discovered. The measurable field strength is not higher as is usual in the whole area. Maybe you also have made the experience that often the causes can't be found when your computer suddenly "crashes" out of the blue.
Here the mentioned vortex of the electric field is capable to deliver plausible explanations because it is not bound to the geometry of an antenna and in addition is highly active without being detectable with the usual EMC measurement methods of the interference radiation measurement!

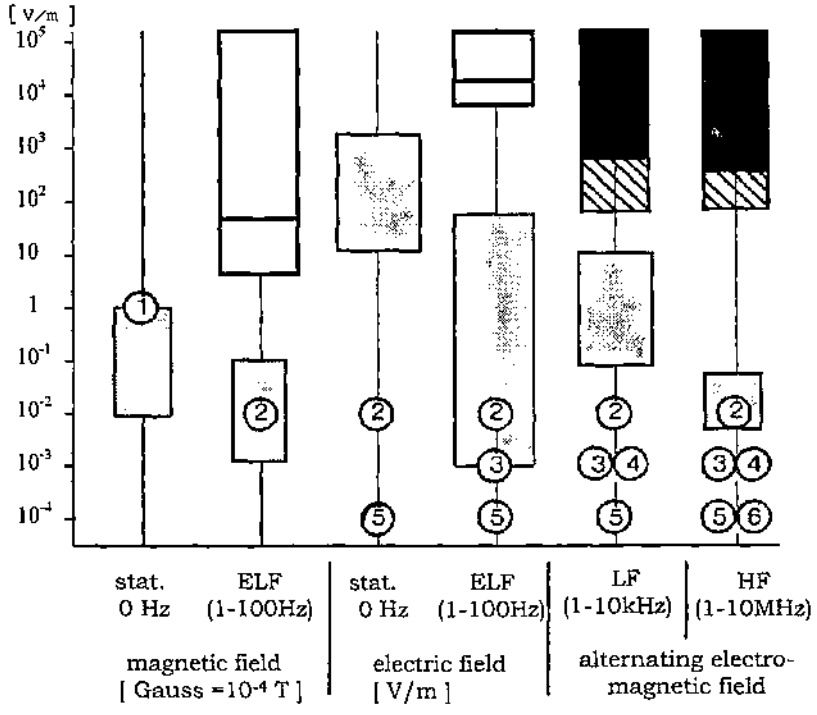


Fig. 2.7: Intensities of natural electromagnetic fields (electric, magnetic and electromagnetic fields)

In addition to fig. 1.1, page 3,
magnetic field in Gauss (= 10^{-4} T),
electric field in V/m.

<i>: A.S. Presman: Electromagnetic Fields and Life.
Plenum Press, New York - London, 1970

2.7 Tasks of the biological compatibility

The second leg of the environmental compatibility (EC) forms the biological compatibility (BC) besides the electromagnetic environmental compatibility. Whereas the interests of the EMC are looked after by electrotechnical engineers and electrophysicists, with the BC also doctors, biologists and architects are addressed.
Moreover this leg is already very old and already existed long before artificial interference sources could be created by mankind. The interaction between the arising interference sources in nature and the biological systems in general and specially men always interested the doctors, the priests, the druids and geomants, that not seldom looked after several functions in personal union equally. Unfortunately they as a rule have kept their knowledge and capabilities as secret knowledge, didn't make any recordings and merely initiated and trained their respective successors. Through that a great deal got lost and today non-medical practitioners, homeopaths and esoterics trouble themselves to take up to the far-reaching buried knowledge.
Because this concerns pure knowledge by experience, often the with the topic occupied persons themselves are not capable to say anything about the physical backgrounds and causes. One concentrates entirely on the under certain circumstances reachable results and only in rare cases on reproducable effects. In some areas the scientific assignment already has succeeded, have parascientific phenomena managed their admission in the so called "exact sciences", but in most experience disciplines the assignment is still due. There still is a lot to do here.

In the time as there not yet were operated any artificial interference sources on our planet, the senses of man naturally were a whole lot sharper for his electromagnetic environment as today. Today, where there scarcely is a place on earth where we are not irradiated by terrestrial transmitters, by satellites or by the netfrequency that is measurable everywhere. In the bluntness of our senses perhaps the hybris of modern man is founded, with which he wants to rise himself above esotericism, geomancy and other sciences of experience and thereby dispute the electric and magnetic fields their biological effectiveness.

The fields of natural origin form an electromagnetic environment for men, that they have adapted to and that they probably need for a life in accord with nature. The evolution has taken care for a corresponding adaptation.
In fig. 2.7 in addition to the limits from fig. 1.1 the intensities of natural electromagnetic fields are registered<◁▷>. They lie clearly lower as the recommended limits but exactly in the area wherein the first reactions of living beings are observable.

When we ask us how much electromagnetism is good for us and how much harms us so the obvious answer is: exactly as much radiation as nature dictates in the fluctuations between day and night, between the months, years and in the end between the cycles of sunspots of 11 years. Here the guide value is found that man and nature have adapted themselves to. In fig. 2.7 the corresponding area between the natural minimum and maximum values is given.

Irradiation strengths of the field radiation in the biosphere and how the optical windows are situated in the atmosphere<i>.

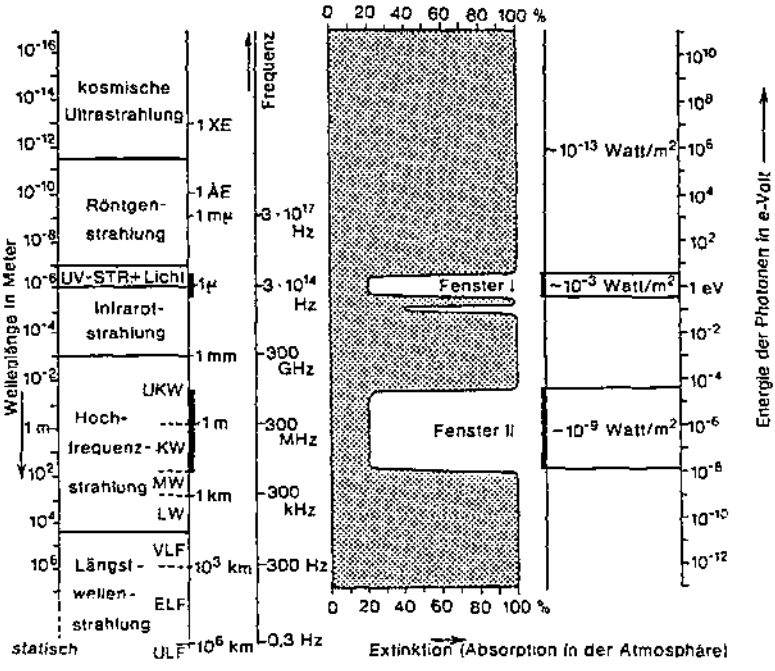


Fig. 2.8: Absorption dependent on frequency in the atmosphere

<i>: entnommen aus: H.L. Konig: Unsichtbare Umwelt (Wetterfuhligk.), 5. Aufl., Bild 8, Seite 14, Verl. Moos & Partner Milnchen, ISBN 3-89164-058-7

2.8 Natural fields

Our electromagnetic environment has something to offer:
From the magnetic north pole to the magnetic south pole of the earth run the field lines of the earth's magnetic field that we are exposed to. With a compass we use the vector character of the magnetic field to fix our position. The induction averaged over time is approx. 50 uT. But it is overlapped by short-time fluctuations caused by geomagnetic storms in the ionosphere.

These storms again are caused by the eddy currents and the currents of charged particles that come from the sun. At the same time these eddy currents in the ionosphere together with the earth's magnetic field form a protective shield with a excellent screening effect for us inhabitants of earth.
In several layers like for instance the ozone and Heaviside layers a filtering and damping until the complete suppression of the very broad cosmic spectrum is caused. This extraterrestrial spectrum of radiation doesn't leave a single frequency out and has a lethal intensity for us.

Only for a little window in the frequency spectrum, radiation can pass almost undamped, as can be seen in fig. 2.8: the light with the spectrum of the colors. For this nature has donated man a sense organ so that man can protect himself against too high dose values. After all, who will look voluntarily into the sun? We only get into trouble when our sense organ doesn't function any more (for instance in the fringe range of the visible spectrum, the UV-range).

For other frequencies of electromagnetic radiation man neither has a sense organ but that doesn't mean that he is not influenced by these. Here, as in the UV-range he only indirectly notices that he has got too high a dose when he has to discover some influences on his well-being and his health. Without the help of neutral measurement apparatus he himself by no means is in a position to make a connection between an excessive exposition to radiation and his health problems.

When natural field strengths should be used as a measure for technical limits, so there should be paid attention to the fact that nature doesn't know intense continuous irradiation. The values are subject to powerful fluctuations that leave men and nature the chance to regenerate.
The television stations not even think it is necessary to reduce their broadcasting power after the end of broadcasts and further sprinkle the sleeping population with test signals, with senseless pictures of going by underground or nonstop program advertisements. People need the intermissions. That again shows how good nature means it with us.

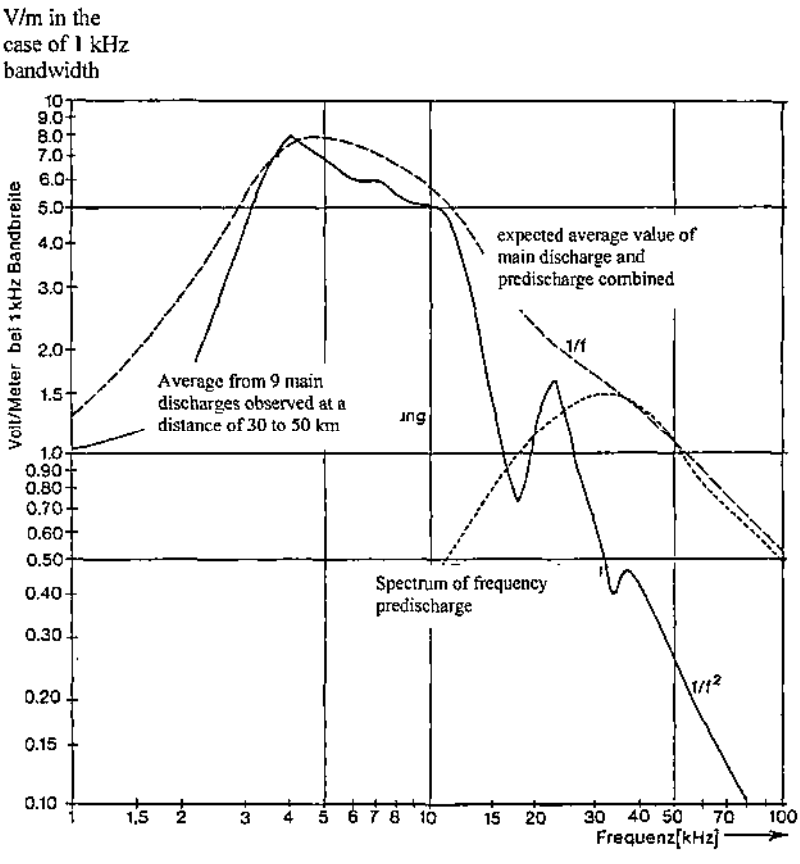


Fig. 2.9: Spectrum of frequency of one lightning, measured
field strength at a distance of 1.6 km from the place of origin. See Watt and Maxwell:<i,ii>

___ from: _____
<i>: H.L. Konig: Unsichtbare Umwelt (Wetterfuhligk.), 5.Aufl., Bild 38, Seite 27, Verl. Moos & Partner Munchen, ISBN 3-89164-058-7, see <ii>.

2.9 Electricity of the air

The electrostatic field strength of the earth lies between 50 and 500 V/m. That is a whole lot considering that voltages off 60 Volts can be lethal for man. But a living person distorts the terrestrial E-field for reason of his own field and his electric conductivity, so that there exists no danger for him as long as he doesn't grow into the sky.

Maybe the dinosaurs had to become extinct because they were to big and for instance the E-field near the ground had risen with a jump by a meteorite that brought a high charge from the cosmos. That would explain why the smaller living beings could survive the natural disaster.

Also the thunderstorm electricity can become life-threatening. Burns, heart and brain failures are the most common consequences. After all the probability to be struck by lightning is four times higher as to have six right ones in the lottery.
Over the lightning channel of approx. 1 meter in diameter charges between 10 and 200 C are transported what results in current strengths of 2000 up to 200,000 A. The main discharge lasts between 10 and 50 usec. With the preceding and all the following discharges it lasts over a second.
Field strengths on the scale of 4,000 V/m are typical but in a distance of 5 km these wear off to 8 V/m. The frequency spectrum of a lightning reaches 4 powers of ten into the range of the radio waves. In fig. 2.9 is shown the field strength measured in a distance of 1.6 km from the place of origin[<i,ii>].

The origin of lightnings is still an unsolved problem after the well-known models (Wilson) arc not in a position to explain the reason for the origin of the potential difference of more than 100 million Volts required for the ionization of the air. Also the lightnings that struck in the direction of the ionosphere still are mysterious.
We'll have to come back to this[<iii>].

<i>: H.L. Konig: Unsichtbare Umwelt (Wetterfuhligkeit), 5. Aufl., Bild 38, Seite 27, Verlag Moos & Partner Munchen, ISBN 3-89164-058-7, according to <ii>.

<ii>: A. D. Watt and E. L. Maxwell: Characterisic of Atmospheric Noise from 1 to 100 Kc/s. Symposium on the Propagation of VLF Waves, Boulder, Col., Paper 35, Jan. 1957.

<iii>: see Part 1, chapter 5.4 and part 2, chapter 14.11.

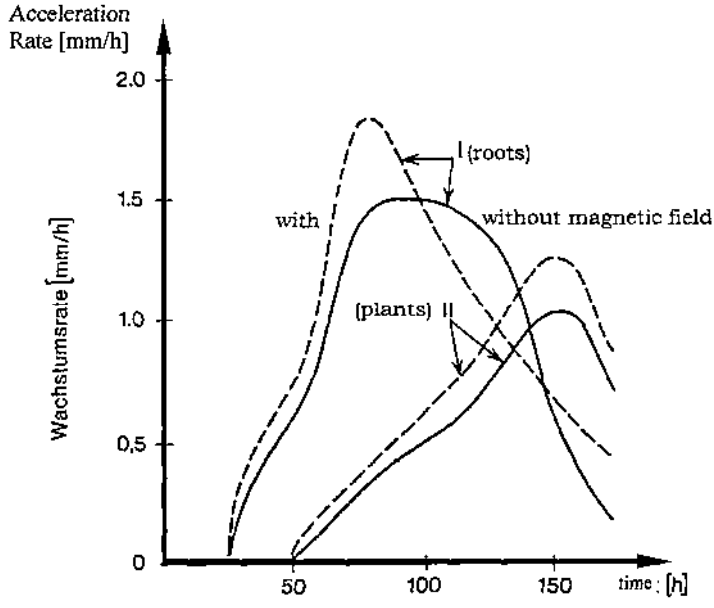


Fig. 2.10 A: Effect of a static magnetic field of 100 kA/m (0,12 Tesla) on the root (I) and on the plant (II) of barley seeds.
plants in the magnetic field: dotted line
plants for checking: drawn line
according to Novitskii[iii]

<iii>: Novitskii, Yu.I.: Effects of a magnetic field on the dry seeds of some cereals. Proceedings of Conference on the Effect of Magnetic Fields on Biological Objects, Moscow, p. 52, 1966.
Taken from: H.L. Konig: Unsichtbare Umwelt (Wetterfuhligkeit), 5. Aufl., Bild 72, S. 73, Verlag Moos & Partner Munchen, ISBN 3-89164-058-7

2.10 Biological effects

The in fig. 2.1 indicated connection between the EMC and the BC, by some authors inofficially described as EMC-environment (EMCE), describes the effect of artificial fields on biological systems. This concerns the sensitive range of tasks that is discussed extremely controversially in the public. The problem thereby is that the artificially produced field strengths lie above the natural field strengths for several scales. In the thirties first reports about troubles were provided by navy radio operators that complained about headache, dizzyness, concentration failure and indisposition. Besides these negative reports concerning the so called "radio operator disease" at the same time medical usages concerning high-frequency therapy were tested. In the beginning this diathermy called healing method still was a short wave irradiation. Today it is extended into the microwave range and uses the thermal effect of electromagnetic rays. The increased temperature of the tissue causes an increased local blood flow. This supports healing processes, loosens cramped muscles and can help in case of rheumatic fever. The advantage of the HF-irradiation compared to contact heat by a hot-water bottle or by infrared rays is the higher penetration depth. Herein short waves are superior to microwaves. But microwaves can be better focussed on a certain part of the body. Is the temperature further increased, so the tissue is damaged. This is used for the treatment of cancer and is called hyperthermy. Because cancer cells as a rule are flowed with blood worse than healthy cells, they are more sensitive to heat and therefore are faster destroyed than healthy cells at a correspondingly increased temperature. In this way for Instance in the USA cattle with a so called cancer eye are treated. For that the spot suffering from cancer is irradiated with 2MHz-waves for 30 seconds with a handheld apparatus of 10 Watts broadcasting power. The rate of succes is given to be 90%! The method of hyperthermy has not yet been able to establish in the area of the medicine for humans. Also at our college corresponding research work is carried out in co-operation with the radiological clinic of the university of Freiburg (Germany)<i>.

The thermal effects of high-frequency fields are therefore well-known and subject of scientific research. On the other hand and in spite of numerous publications, non-thermal effects even today are denied by some scientists as non-existent<ii>. Here only a few counter-examples will be listed.

Fig. 2.10 A shows the effect of a static magnetic field of 0.12 Tesla on the root (1) and on thc plant (II) of barley seeds. The readable effect is an acceleration of the growth of the treated seeds (dotted line) compared to the plants for checking (drawn line)<iii>.

<i>: H. Schulz, W. Oppitz: Lokale Hyperthermie durch hochfrequente Wirbelstrome, Medizin Technik 1, 1987.

<ii>: G. Nimtz: Mikrowellen, Einfuhrung in Theorie und Anwendung. 2. Aufl., BI-Wissenschaftsverlag 1990, ISBN 3-411-03203-0

<iii>: Novitskii, Yu.I.: Effects of a magnetic field on the dry seeds of some cereals. Proceedings of Conference on the Effect of Magnetic Fields on Biological Objects, Moscow, p. 52, 1966; taken from: H.L. Konig: Unsichtbare Umwelt, fig.72, p. 73, Verlag Moos & Partner Munchen, ISBN 3-89164-058-7

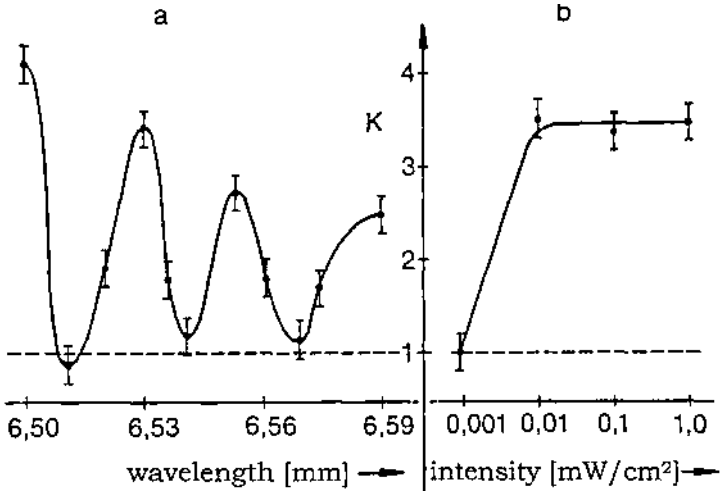


Fig. 2.10 B: Measured increase in the production (K) of colicin by colibacteria as a microwave effect

a) as a function of the wavelength,
b) as a function of the intensity of the microwaves,

according to Keilmann<i>.

taken from:
<i>: H. L. Konig: Unsichtbare Umwelt (Wetterfuhligkeit), 5. Aufl., Bild 106, S. 111. Verlag Moos & Partner Munchen, ISBN 3-89164-058-7

A static field naturally produces no induction and hence no heating will arise. In the case of alternating fields the thermal effect in experiments is excluded by working with cxtremly low stimulations. The example after fig. 2.10 B shows the measured increase in the production (K) of colicin by colibacteria at only 0.01 mW/cm^2 microwave power<i>.

In addition the example provides the interesting information that obviously only a certain frequency and it's harmonic waves increase the production, other frequencies on the other hand remain inactive. Because only minimal field strengths are used it more likely concerns an information-technical as an energetic effect (curve a). This statement is supported by the observation that an increase of the intensity not at all necessarily as a consequence also increases the production (curve b). What the colibakteria need is obviously neither energy nor heat but only a certain frequency that stimulates the colicin production or the growth.

Should it really be confirmed that biological effects of electric and magnetic fields can be produced by certain frequencies and can't happen by an energy transition so the discussions about limits must seem ample meaningless.

Maybe the one or the other in thought already draws a connection to the acceleration, the acclerated growth of kids, which is observed world-wide and stronger in cities than in the country. It started for approx. 100 years simultaneous with the electrification of the homes in the towns. In Asia the acceleration and also the electrification have started later. Other growth stimulating effects like radio waves, X-ray examinations, atomic tests and provable also the nourishment with vitamin B6 happened only until much later and at the most could support the actual effect.

But how should a proof be offered when anyway the field strength not at all can have a decisive influence on the growth of man after the statement of fig. 2.10 B? Which information is authorative? Where lies the responsible frequency window? Does the information actually manifest as frequency? Is the authorative influential factor also in this case not at all noticed and measured?

A lot of pressing questions are still outstanding. But in any case the numerous influential factors detected in experiments do not at all let themselves reduce to a sole factor, for instance the nourishment. For a family doctor it may be comfortable to be able to give an easy explanation: „Cause is the nourishment!" With such a reductionism on the other hand the actual cause stays in the dark and the asked questions in this way won't let themselves be answered.

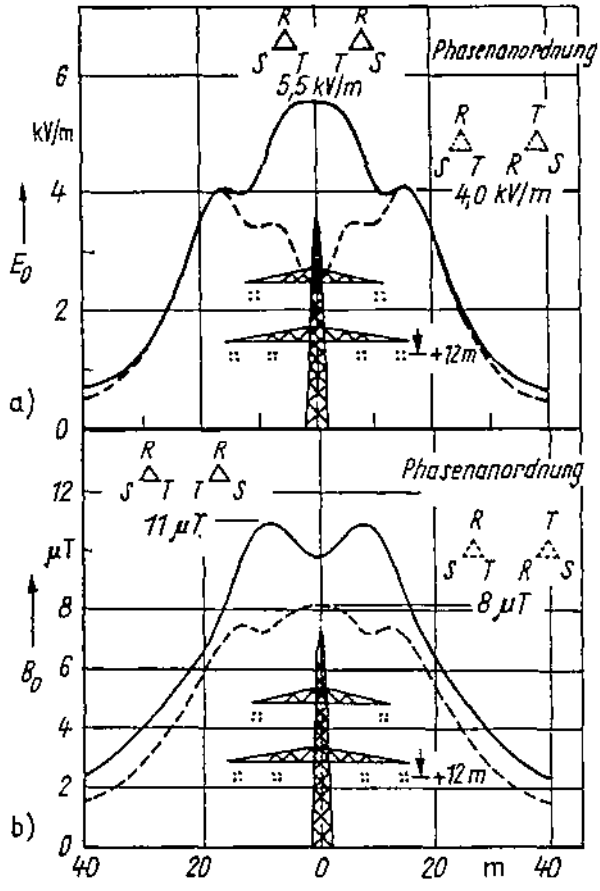


Fig. 2. 11: ____ profile of the 50-Hz-field on the ground at 380kV/1kA in each circuit.<i>
a) electric field,
b) magnetic field.

____ taken from:
<i>: E. Habiger u. a.: Elektromagnetische Vertraglichkeit, fig. 7.3, page 147 and Fig. 7.1, page 146, 2nd Ed., 1992. Berlin, Miinchen: Verlag Technik.

2.11 Artificial fields

The scepticism of people feeling close to nature is especially directed against artificial fields that man can't see nor hear nor smell. Objects of doubt are first of all the installations for the creation, distribution and conversion of electric energy.

An essential role plays the fact how close the supplying and the draining conductors are to each other, so that the respective fields can compensate each other. The worst solution one can think of is realized at the electrified railway. Here the rails and the earth are used as the draining conductor for the current while there exists an ample large distance to the supplying conductor. A compensation is almost impossible thus causing gigantic interference fields that are detectable even at a distance of 10 kilometers. The increased putting on of railway engines feeded by rectified current is likely to aggravate the set of problems because the non-sinusoidal absorption of current is strongly afflicted with harmonic waves.
With high tension transmission lines (fig. 2.11) the interference field strength is reduced when the three cables are suspended with only little distance between them. But even the selected phase order can play a role. Of course the optimal compensation effect is guaranteed with cables in the earth. But these are expensive and technically not realizable for such high voltage levels.

In the eighties also the computer screens got in the headlines. The terminals are furnished with a cathode ray tube and have a very broad radiation spectrum that already starts at 0 Hz. Here already static maximum values of 64 kV/m are measured<i>!

I'requency range	Measured maximum values E_{max} resp. H_{max}	30 cm in front of the screen
static field (0 Hz)	64 kV/m	
30 Hz. 60 Hz	10 V/m and	
	0.2 - 1 A/m	
5 Hz - 1 kHz	1800 V/m and	10 V/m and
	4 A/m	0,6 A/m
50 Hz - 0,5 MHz	1 A/m	
15 kHz-220 kHz	50 V/m and	15 V/m and
	1.1 A/m	0,17 A/m
3 MHz -300 MHz	< 0,2 V/m	

Fig. 2.11: Electromagnetic fields from screens<i>

system about	used frequency	measured value
radio broadcasting station (MW 2O kW)	6OO kHz	2...17 V/m
radio broadcasting station (SW 1OO kW)	15 MHz	1...25 V/m
SOS-transmitter on a ship (1OO W)	41O kHz	1...3 V/m
Epitaxiedevice (induction oven)	45O kHz	37...4OO V/m
HF-welting press (welding of plastic foils)	27,12 MHz	70…85 V/m
radar on a ship (TRN 311)	9,3 GHz	1...3O uW/cm^2
radar of an airplane	9,2 GHz	45O... 28OO uW/cm^2
domestic appliances measured in a distance		of 3O cm:
hand mixer	5O Hz	5O V/m
refrigerator	5O Hz	6O V/m

Fig. 2.12: ____ the electric field strength resp. Power density in our environment.<i>

____ taken from: _____

<i>: E. Habiger u. a. : Elektromagnetische Vertraglichkeit, Fig. 7.2, page 146, 2. Ed., 1992, Berlin, Munchen: Verlag Technik, ISBN 3-341-00993-0

2.12 Protection against artificial fields

Artificial fields more or less always occur in the neighbourhood of electric apparatus and installations. Especially problematic are those that work with the free radiation of electromagnetic fields, that is all the radio broadcasting stations, handheld and radar transmitters.
Herewith it is important that not needed parts of the antennas are shielded, that antennas with little close by field pollution are used and that the stand should be situated at least 3 km remote from inhabited areas. For instance at radar installations damping values of 10 dB and more can be obtained only by using a corresponding tree growth.
This obviously concerns a damping of the waves in a dielectric manner. We'll have to come back to this because textbook physics does not know a corresponding damping term in the wave equation.

The radiation leaking out in case of the high-frequency welding of plastic foils and of the microwave oven should be minimized.
In the case of induction ovens or of motors an active shielding often causes problems so that for simple domestic appliances like a hand mixer and especially for the electric hair-dryer non proportionally high field strength values are measured. Fig. 2.12 informs about it.
Protective measures for the operator are hardly possible. To protect uninvolved people not only the apparatus but also the rooms and eventually whole parts of buildings had to be shielded and grounded.

Sometimes also fairly simple possibilities are helpful like e.g. the usage of a remote control. By clearing away the cable salat at the workplace and at the sleeping place induction loops can be removed. Alarm-clocks operated by batteries should have preference over those operated by the network. Mattresses with metal in them and spring-beds which clearly act as an antenna should be avoided. In extreme cases even so called "current-free switches" and shielded network lines are recommended (fig. 2.13).

In the area of the network supply lines a choking coil can help decrease the spreading of high-frequency interference radiation. It is especially important that all the conducting metallic objects like e.g. water pipes, heatings, steel racks, machines, switching racks, steel armaments and metallic windows should be grounded properly, because otherwise extremly high static charges could result instead of a shielding. Construction biologists recommend to when possible do without metals when building houses and furnishing, what of course is only realizable with limitation.

In any case numerous measures are known that to a lesser extent find their legitimation in classical physics, but more likely in precaution. As long as we do not know which phenomenon causes the electrosmog and we don't have a measuring-instrument at our disposal, precaution is really the only thing we can do irrespective of the effectiveness of the measures and of the arising costs!

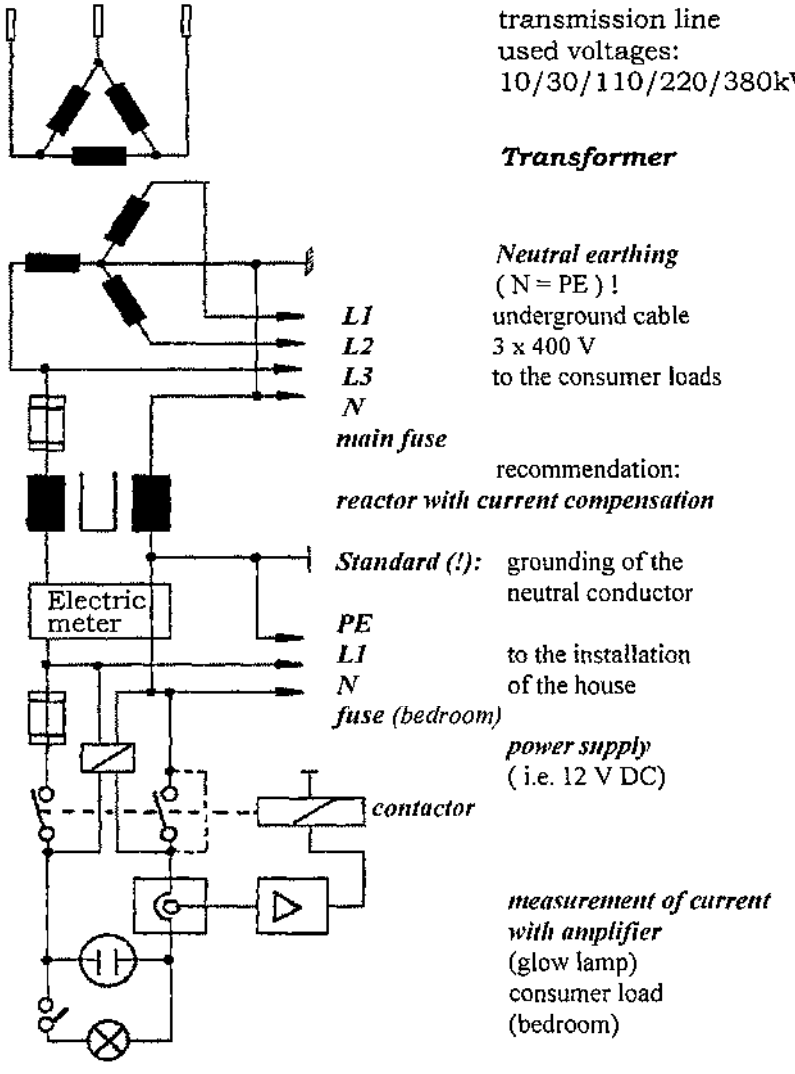


Fig. 2.13: About the circuitry and the problems involved with a "current-free switches" installation

2.13 Unsolved tasks

The report concerning the actual state of research could be continued at will. But the expositions should suffice, to understand what are the tasks of the electromagnetic environmental compatibility (fig. 2.1) and which questions still have to be supplied with a solution. One can get deeper into every of the addressed points and then discover that some questions can be expressed sharper and maybe conceivable answers can be found, but at the same time and unavoidable the number of new questions increases faster.

Let us again take up the example of the handheld wireless telephones (chapter 1.2). At least it now is clear to us that the usage of the built-in microwave antenna of a handy is problematic. In the interior of an automobile it never should be used. If, however, one uses the antenna installed on the outside on the sheet metal then the damping and screening effect of the sheet metal chassis is advantageous at least for the handy user.

With that of course the central question is not answered. The question of what the cause is for the interfering and at worst health endangering effect of the HF-radiation. Field freedom we can't find anywhere on this world. Possibly we even need the fields. But then the question is how much is necessary, how much is healthy and how much makes us ill.

The gap of explanation especially gets clear in the case of the static or of the low-frequency magnetic field: away from technical interference sources normally fields on the scale of 10 nT are measurable. Construction biologists say that 20 nT, so twice that value, should not be exceeded at the sleeping place and maybe 50 nT at the desk. These values however are determined purely empirical.

When a person is examined in a nuclear magnetic resonance tomograph that person is exposed to a field that lies between 0.2 and 1.5 Tesla. that is a value 7 till 8 powers often higher than before mentioned without this leading to the death of that person. Entirely on the contrary this method is regarded as especially caring and safe compared to the X-ray examination.

Here again the legitimation of the thesis put forward is entirely comfirmed. The thesis that the well-known physically measurable and controllable phenomena can not be considered as a cause and that possibly a until now undiscovered field phenomenon should be called to account.

Should such a phenomenon exist it should be derived, calculated and proved. We must go to endless troubles and try everything. The actual difficulties wherein the electromagnetic environmental compatibility is stuck are a challenge.

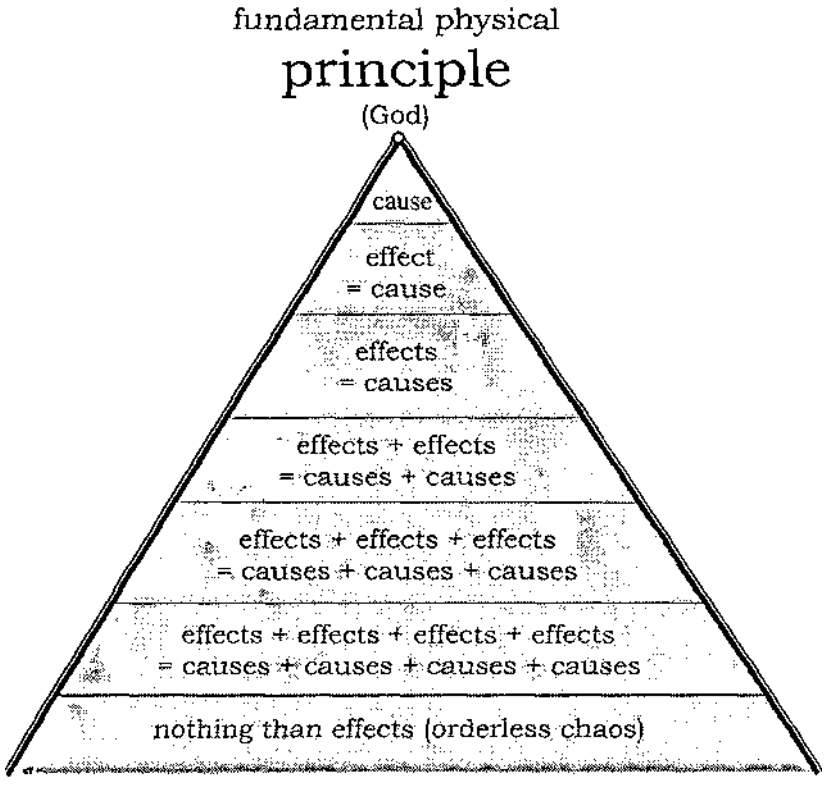


Fig. 3.0: pyramid of causality

vortices are a consequence of the principle of causality

3. Approach

In the question, if there exists a still unknown phenomenon that influences the electromagnetic environmental compatibility, we must fall back far until upon the roots of our physical understanding. Here we find a fundamental principle that until today is not doubted and that is regarded as elementary, the principle of causality. Every result of a measurement, every interpretation is checked for causality and only after passing this examination it is accepted and published.

This principle of cause and effect has established, not only in physics but also in many other disciplines of science. Is an effect observed, so there immediately is asked for the cause. This principle encounters us in daily life<i>.

When all observable and measurable effects ever can be assigned to a cause without force and without exceptional regulations then the logical result is a pyramid of causality. On top a fundamental physical principle is found, that is regarded as given by nature or as given by god and that with its properties is responsible as the cause for different effects. These effects again appear as the cause for new effects and so on (Fig. 3.0). Sometime we have removed us so far from the top of the pyramid that a direct reference to the describable effects can't be made anymore, so the impression could arise that it concerns an isolated and independent discipline. We should take care not to think in such a monocausal way, because both delimitation and avoidance of interdisciplinary working methods will inevitably steer us into a dead end!

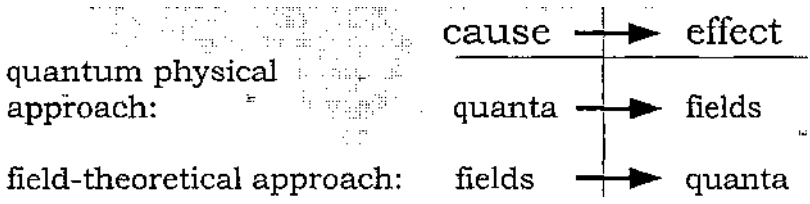
This pyramid of causality stands for the vision of a "unified theory", like it is demanded and sought-after by numerous research scientists. But as long as it is not found, we'll have to do with unsolved problems of causality. About this any number of examples can be given.

A physical principle based on the principle of causality is the vortex. This the eddy current demonstrates us clearly. The cause for its origin is an alternating field. According to Faraday's law of induction this induces a voltage that in a conducting medium results in a current according to Ohm's law. Around this current according to Ampere's law an alternating field forms, that points perpendicular to the current and overlaps the original alternafing field. This induced field first of all is an effect that overlaps the cause and itself becomes the cause. The effect that follows from that further overlaps and forms a new cause etc. In this way vortices form.

Vortices quasi represent the principle of causality.

<i>: When for instance a woman complains: "Doctor, my left knee hurts" (effect). The doctor diagnoses the cause: "Yes, that comes with age!" With that causality is established. "But doctor", says the woman, "my right knee is exactly as old as my left knee!" And already the doctor has a new problem of causality.

Principle of Causality:



violations of the principle of causality:

1. monopoles exist
2. starting point for the strong interaction
3. fields and quanta are a cause at the same time
4. hypothetical particles (gluons, quarks, etc.)
5. transmission of information with speeds faster than light
   - with photons (University of Berkeley)
   - with microwaves (University of Cologne)
   - with laser beams (Technical Univ. of Vienna)
6. transmission of energy with speeds faster than light
   - with scalar waves (Nicola Tesla)

Fig. 3.1: Causality or the principle of cause and effect

3.1 Principle of causality

Our physical view of life strictly obeys the rules of causality, the principle of cause and effect. But there are numerous cases, where causality at first could not be fulfilled anymore. Here alternate solutions had to be found to not endanger this very successful principle. A few examples should clarify this:

1. Technically it is impossible to produce a magnetic monopole. When a north pole is produced then the accompanying south pole is also formed. In the same way only the positive and negative pole can be assembled as the so called dipole. In the microcosm however we find monopoles. Electrons are such particles. To restore causality we must grant the microcosm its own laws that are not valid in the macrocosm! But this monocausal hypothesis contradicts the observation that the microcosm represents an image of the macrocosm and vice versa. Doubts if this assertion is allowed are reasonable.
2. Like charges repel each other and that the more the smaller the distance gets. In an atomic nucleus positively like charged protons are together at the smallest possible room without any repulsion happening. Arithmetically seen all atomic nuclei would have to explosively fly to pieces. But because this doesn't happen, shortly a new and supposedly fundamental interaction, the strong interaction, was introduced to save causality. Nevertheless this interaction now holds the like particles in a not explained manner together. Causality could be obtained only by the introduction of a new fundamental phenomenon.
3. When causality should hold as the supreme principle, it should be demanded with priority for the fundamental phenomena of physics. Instead, in quantum electrodynamics the particle is attributed the same physical reality as the field. With the wave-particle duality Heisenberg has given out the corresponding formula of compromise. This slaps the face of the principle of cause and effect.

Causality on principle allows only two approaches for a solution: the quantum physical approach. which holds the quanta as the cause for the fields, and the field-theoretical ašproach. wherein only the fields act as the cause. For both approaches there are good arguments. The field theorists cite that fields can exist also in the vacuum, so that there exist fields without particles but never particles without fields. Against that the quantum physicists hold that somewhere, even when quite far away, there exist particles and that the measurable fields merely are their action at a distance.

Both approaches first arouse the impression to be fully equal. In the course of the discoveries in the area of quantum physics, the corresponding approach has been able to establish. But it demands that all phenomena have to be understood as a consequence of particles. So should gravitons make gravitation possible, should gluons hold everything together and the quarks form the basic building parts. Meanwhile there is only worked with hypotheses. Out of poverty quantum physics meanwhile has said goodbye to strict causality, after the number of the violations of causality has risen that much and in every respect there is a lack of models of explanation. It seems as if the end is reached, as if the quantum physical approach to a large extend is exhausted.

Field-theoretical approach:

3rd Maxwell equation

$$\boxed{\text{Div}\,\mathbf{B} = 0} \qquad (3.3)$$

4th Maxwell equation

$$\boxed{\text{Div}\,\mathbf{D} = \rho_{el}} \qquad (3.4)$$

With the relations of material:

$$\boxed{\mathbf{B} = \mu \cdot \mathbf{H}} \qquad (3.5)$$

$$\boxed{\mathbf{D} = \varepsilon \cdot \mathbf{E}} \qquad (3.6)$$

$$\mu \cdot \text{Div}\,\mathbf{H} = 0 \qquad (3.3^{*})$$

$$\varepsilon \cdot \text{Div}\,\mathbf{E} = \rho_{el} \qquad (3.4^{*})$$

H: source free vortex field

E: non-vortical source field

New field-theoretical approach: $\boxed{\text{Div}\,\mathbf{D} = 0}$ (3.7)

thus: Div **H** = 0 (3.3**) and $\boxed{\text{Div}\,\mathbf{E} = 0}$ (3.7*)

H and **E**: source free vortex fields!

Einstein:

"Is it conceivable, that a field theory permits us to understand the atomistic and quantum structure of reality? This question by almost all is answered with No. But I believe that at the moment nobody knows anything reliable about it"<i>.

Pauli:

"The electric elementary quantum e is a stranger in Maxwell-Lorentz' electrodynamics"<ii>.

Fig. 3.2: The field-theoretical approach

<i>: A. Einstein: Grundzuge der Relativitatstheorie, S 162, Anhang II; 5. Aufl., Vieweg, Braunschweig 1974.

<ii>: W. Pauli: Aufsatze und Vortrage uber Physik und Erkenntnistheorie. Vieweg, Braunschweig 1961, entnommen aus:
H. G. Kussner: Grundlagen einer einheitlichen Theorie der physikalischen Teilchen und Felder. Musterschmidt-Verlag Gottingen 1976, S. 161.

3.2 Field-theoretical approach

The field-theoretical approach is the very much older one. Until the last turn of the century the world in this respect still was in order. Max Planck, by the discovery of quanta, has plunged physics into a crisis.
Albert Einstein, who, apart from his lightquanta hypothesis, in his soul actually was a field theorist, writes: „Is it feasible that a field theory allows us to understand the atomistic and quantum structure of reality?". This question by almost all is answered with No. But I believe that at present nobody knows anything reliable about it[i]".

By the way the "No" can be justified by the fact that the field description after Maxwell is by no means able to the formation of structure so that it is not possible for quanta to appear as a consequence. The field-theoretical approach could, obstructed by Maxwell's field theory, not further be pursued and to this until today nothing has changed.
Nevertheless it would be an omission to not at least have tried this approach and have it examined for its efficiency. Maybe the above mentioned problems of causality let themselves be solved much more elegantly. For this however the Maxwell theory must be reworked to a pure field theory. With the well-known formulation it offends against the claim of causality, since it is field theory and quantum theory at the same time. To Maxwell himself the quanta were still unknown, but today we know that the fourth Maxwell equation is a quantum equation:

$$\mathrm{div}\,\mathbf{D} = \rho_{el} \quad (3.4)$$

After this the electric field is a source field whereby the individual charge carriers, like e.g. electrons, act as sources to form in their sum the space charge density p_{el}. The other three Maxwell equations are pure wave equations. In this way the third equation identifies the magnetic field as source free:

$$\mathrm{div}\,B = O \quad . \qquad (3.3)$$

This for Pauli probably was the reason to call, "the electric elementary quantum e^- a stranger in Maxwell-Lorentz' electrodynamics"[ii].

Let's return to the principle of causality according to which in the field-theoretical approach the fields should act as a cause and not the particles. In a corresponding field description quanta logically have not lost anything. It is only consistent to likewise demand freedom of sources of the electric field:

$$\mathrm{Div}\,D = O \quad . \qquad (3.7)$$

When the electric field is not a source field, then what is it? The magnetic field is a vortex field. Hence it would be obvious to also conceive the electric field as a vortex field. Numerous reasons speak for it:
1. A non-vortical gradient field, like it is formed by charge carriers, merely represents a special case of the general vortex field. Only by the generation of quanta a source field can form as a special case.
2. The electromagnetic wave teaches us the duality between the E- and the H-field that are directed perpendicular to each other and are in a fixed relation to each other. If one of them is a vortex field then also the dual field must be a vortex field.

Duality:

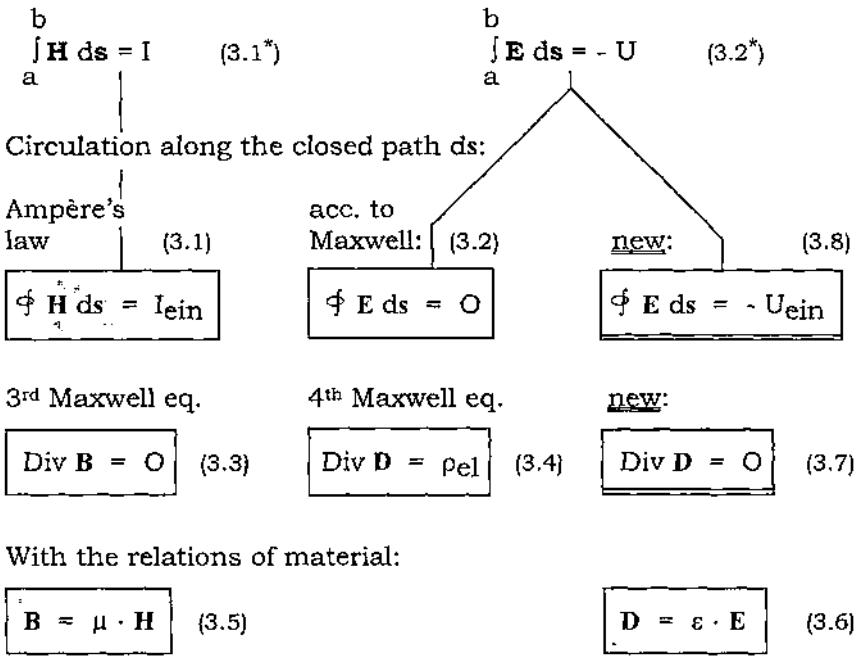

b
∫ H ds = I (3.1*)
a
b
∫ E ds = - U (3.2*)
a
Circulation along the closed path ds:
Ampère's law (3.1)
acc. to Maxwell: (3.2)
new: (3.8)
∮ H ds = Iein
∮ E ds = O
∮ E ds = - Uein
3rd Maxwell eq.
4th Maxwell eq.
new:
Div B = O (3.3)
Div D = ρel (3.4)
Div D = O (3.7)
With the relations of material:
B = μ · H (3.5)
D = ε · E (3.6)

Fig. 3.3: The dual field description

Dual approach according to Jackson<i> or Lehner<ii>:

Div B = ρ_{magn} because of the 4th Maxwell equation: Div D = ρ_{el} (3.4)

ρ_{magn} = magnetic monopoles should exist,
otherwise dual extension (3.8) not allowed!

Caution: closed loop conclusion!
Maxwell theory proves the correctness of the Maxwell theory.
Result: search for magnetic monopoles unsuccessful.

<i>: J. D. Jackson, Classical Electrodynamics, 2nd Ed. , John Wiley, New York, 1975, S. 251 - 253

<ii>: G. Lehner, Elektromagnetische Feldtheorie, Springer-Verlag Berlin, Heidelberg 1990, S. 35 - 36 und S. 533 ff.

3.3 Duality

Duality is a fundamental physical principle. Opposite, but one another complementing phenomena can be assigned to each other in pairs, like e.g. (see fig. 8.8):

	Yin (female)	——		Yang (male)
	south pole	——		north pole
	⊖	——		⊕
R [Ω]	resistance	——	R^{-1} [Ω^{-1}]	conductance
U [V]	voltage	——	I [A]	current
E [V/m]	electr.field strength	——	**H** [A/m]	magnet.field strength
Q [As]	charge	——	ϕ [Vs]	magnetic flux
D [As/m^2]	electr.displacement	——	**B** [Vs/m^2]	magnetic induction
ε_0 [As/Vm]	electr.field-constant	——	μ_0 [Vs/Am]	magnet.field-constant
ρ_{el} [As/m^3]	electr.charge density	——	ρ_{magn}[Vs/m^3]	magnet.charge density
	induction law	——		Ampère's law
	potential vortex	——		eddy current
	(vortex of the electric field)			(vortex of the magnetic field)

First of all we find the duality confirmed in the case of the electromagnetic wave spreading in a homogeneous medium. Here the field pointers of E and H are directed perpendicular to each other and are in a fixed relation to each other. But if the wave is damped in the presence of matter, for instance by eddy currents, then by basing on Maxwell's field theory the duality will vanish.

A good example for perfect duality provides the integral of a field strength vector along the path from a to b:

$$\int_a^b \mathbf{H}\,ds = I \qquad (3.1^*) \qquad \text{and} \qquad \int_b^a \mathbf{E}\,ds = U \quad . \qquad (3.2^*)$$

Urn if the integration takes place along a closed path then the circulation yields:

$$\oint \mathbf{H}\,ds = I_{eing} \qquad (3.1) \qquad \text{and} \qquad \oint \mathbf{E}\,ds = O \quad . \qquad (3.2)$$

According to Ampere's law (3.1) the magnetic field can thus form enclosed currents and spatially spreading eddy currents. The electric field on the other hand should be irrotational (3.2).

Let's take the case that the electromagnetic wave is damped by eddy currents and the magnetic field in this way becomes a vortex field. The electric field itself that, as said, is in a fixed relation and perpendicular to the vortex field H, will show all the vortex-typical properties. Hence nothing would be more obvious as to also grant the electric field a formation of vortices:

$$\oint \mathbf{E}\,ds = -U_{eing} \quad . \qquad (3.8)$$

Critics of this dual approach, like for instance Jackson[i] or Lehner[ii], point out that with reference to the fourth Maxwell equation the electric field should be understood as a source field:

$$\text{div}\,\mathbf{D} = \rho_{el} \quad . \qquad (3.4)$$

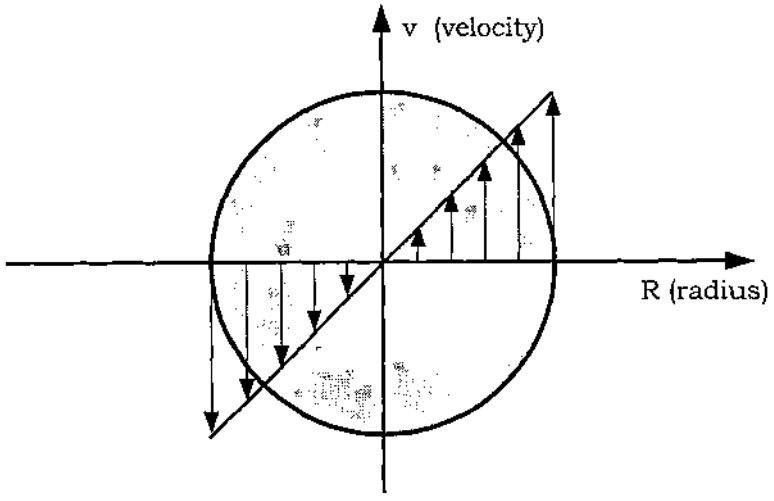


Fig. 3.4a: Velocity distribution v(R) for a vortex with rigid-body rotation

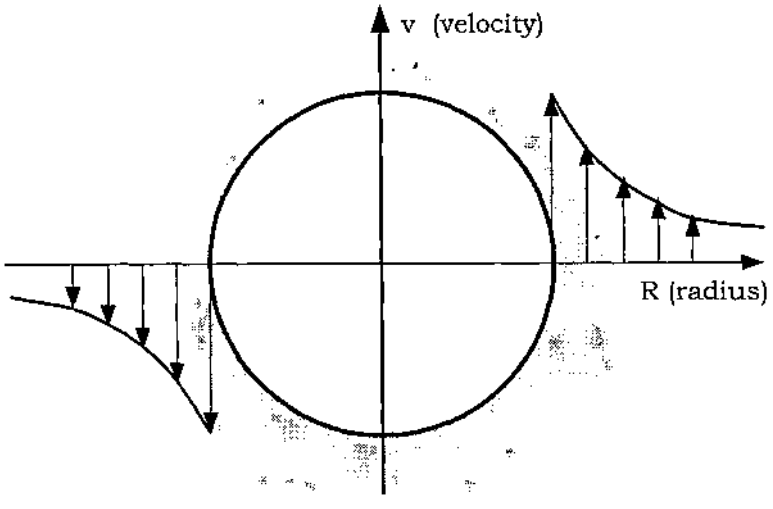


Fig. 3.4b: Velocity distribution v(R) in a potential vortex (see Lugt[<i>]).

<i> Lugt, Hans J.: Vortex flow in nature and technology. Krieger publishing company, Florida 1995; page 30 and 31, ISBN 0-89464-916-7

For a complete duality from the existence of electric monopoles, individual in the space charge density ρ_{el} contained charge carriers, the claim for magnetic monopoles is derived. In spite of intensive search such north or south pole particles however until now could not be found. Herein from the sight of criticism is seen a confirmation for the assumption that Maxwell's field theory is self-contained and hence in principle may not be extended. The critics have a problem of causality: They postulate source fields that at the same time should be vortex fields. But if one asks how one should imagine such a field that is scalar and at the same time vectorial, then it looks as if no one has ever made any thoughts about it.

The from causality derived solution of the problem of lacking duality requires to extend the Maxwell theory in one point, by introducing the potential vortex of the electric field here and at the same time make a cut in another place:

$$\text{div } D = O \tag{3.7}$$

With this formulation, the assumption of a freedom of sources in principle, the complete duality already is reached: Now neither magnetic nor electric monopoles exist (Fig. 3.3)! At first we have to accept the loss of the electron hoping that the calculation in the end works out: the "exchange" vortices against particles, by which the quanta can be banned from the field theory, suggests that the elementary particles themselves are nothing else as spherical vortices that have found to an own physical reality.

3.4 Flow vortices

In fluid engineering convincing and strong indications for the correctness of the chosen approach can be found. It benefits us that hydrodynamic vortices are visible or can be the injection of smoke, e.g. in a wind-tunnel.
Already Leonardo da Vinci had observed at liquids that there exist two dual basic types of plane vortices: "Among the vortices one is slower at the centre than at the sides, another is faster at the centre than at the sides."
A vortex of the first type, also called "vortex with rigid-body rotation", is formed for instance by a liquid in a centrifuge that due to its inertia of mass is pressed to the edge because there the largest velocity exists. In an analogous way the electromagnetic vortex in electrically conductive material shows the well-known "skin effect" (Fig. 3.4a). To explain the other vortex Newton describes the experiment where a rod is dipped into a liquid as viscous as possible and then is turned. In this potential vortex the velocity of the particle increases the closer to the rod it is (Fig. 3.4b).
The duality of both vortex phenomena becomes obvious when we make ourselves clear that in the experiment with the centrifuge the more liquid presses to the edge the less viscous the medium is. And that on the other hand the potential vortex forms the stronger the more viscous the medium is. As conclusion we read in text books that the viscosity of the liquid decides whether a vortex with rigid-body rotation or a potential vortex is formed.

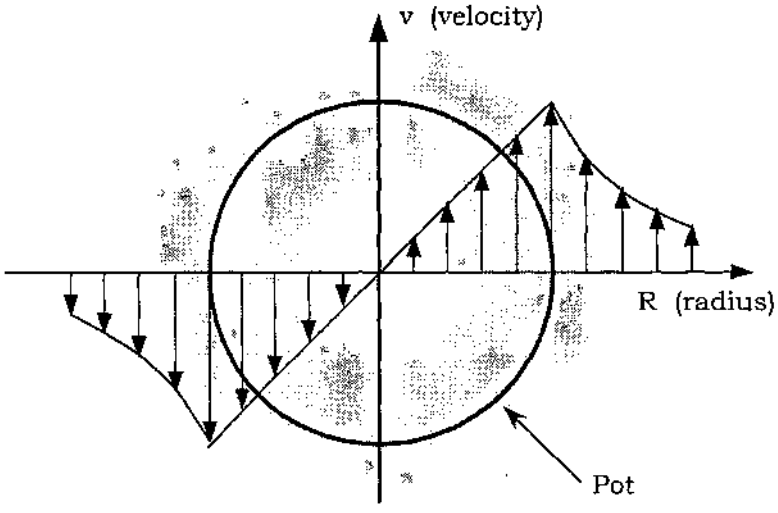


Fig. 3.5: Combination of a vortex with rigid-body rotation and a potential vortex (Lugt<i>).

<i> Lugt, Hans J.: Vortex flow in nature and technology. Krieger publishing company, Florida 1995; ISBN 0-89464-916-7

3.5 Rankine vortex

When we, in a third experiment, immerse the centrifuge filled with water into a tough medium and let the centrifuge rotate, then inside the centrifuge a vortex with rigid-body rotation forms and outside the centrifuge a potential vortex forms (Fig. 3.5).

It is obvious that one vortex always causes the other vortex with the opposite properties and so the existence of one causes that of the other. So in the first case, that of the vortex with rigid-body rotation, outside the centrifuge potential vortices will form in the surrounding air, whereas in the second case, that of the potential vortices, the turning rod itself can be interpreted as a special case of a vortex with rigid-body rotation. Hence in all conceivable experiments the condition always is fulfilled that in the centre of the vortex the same state of "peace", that we can fix as "zero", prevails as in infinity.

When we take a tornado as an example, thus a whirlwind. In the "eye of the cyclone" there's no wind at all. But when I go away from this spot, then I'm blown to the outside. I can really feel the vortex with rigid-body rotation in the inside. If. however, I am standing on the outside, then the potential vortex tries to pull me into the vortex. This potential vortex is responsible for the structure and in the end also for the size of the tornado.

At the radius of the vortex, the place with the largest speed of the wind, an equilibrium prevails. The vortex with rigid-body rotation and the potential vortex at this point are equally powerful. Their power again is determined by the viscosity, which thereby fixes the radius of the vortex!

Therefore meteorologists pursue with interest whether a tornado forms over land or over water. Over the ocean for instance it sucks itself full with water. In that way the potential vortex increases in power, the radius of the vortex gets smaller and the energy density increases dangerously.

If the knowledge from hydrodynamics is transferred to the area of electromagnetism, then the role of the viscosity is taken over by the electric conductivity. The well-known current eddy occurs in the conductor, whereas its counterpart, the postulated potential vortex, forms in the bad-conducting medium, with preference in the dielectric. The duality of both vortices is expressed by the fact that the electric conductivity of the medium decides whether current eddies or potential vortices can form and how fast they decay, i.e. convert their energy into heat.

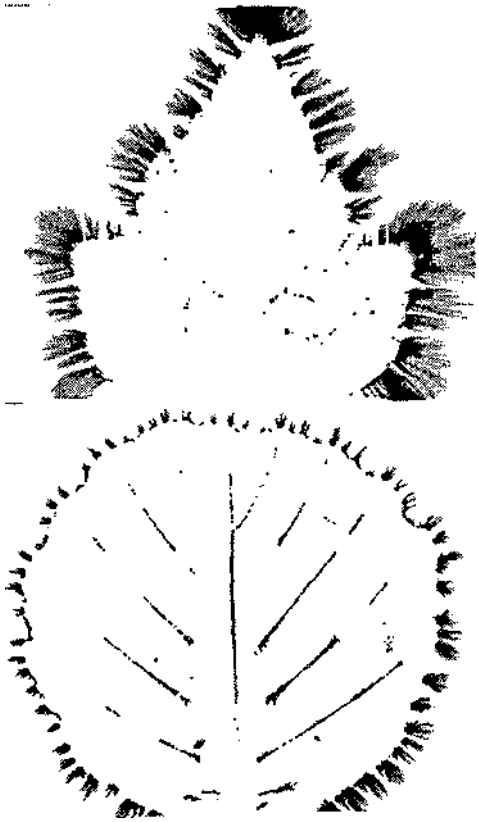


Fig. 3.6: Kirlian photograph of leaves[<i>] structured corona discharges

<i>: (produced by students of electronics in the laboratory for power electronics of the Author, University of Applied Sciences Furtwangen 1991)

<ii>: Kupfmuller, Karl: Einfuhrung in die theoretische Elektrotechnik, Springer-Verlag Berlin, 12. Auflage 1988, page 453

<iii>: Kupfmuller, Karl: Einfuhrung in die theoretische Elektrotechnik, Springer-Verlag Berlin, 12. Auflage 1988, page 208

3.6 Vortex and anti-vortex

Fig. 3.5 shows that vortex and dual anti-vortex mutually cause each other. In high tension transmission lines we find a striking example for the combination of current eddy and potential vortex. Within the conductor current eddies are formed. Thus the current density increases towards the surface of the conductor (skin effect). Outside of the conductor, in the air, the alternating fields find a very bad conducting medium. If one follows the text book opinion, then the field outside the conductor should be an irrotational gradient field! But this statement causes unsolvable problems.

When vortices occur inside the conductor, then for reasons of a detachment of the vortices without jumps at the interface to the dielectric, also the fields in the air surrounding the conductor must have the form and the properties of vortices. Nothing would be more obvious as to also mathematically describe and interpret these so-called gradient fields as vortex fields. When looking exact this argument even is mandatory!

The as laws of field refraction known boundary conditions<ii> in addition demand steadiness at the interface of the conductor to the dielectric and don't leave us any other choice. If there is a vortex field on one side, then also the field on the other side is a vortex field, otherwise we offend against the law! Here an obvious failure of the Maxwell theory is present.
Outside the conductor, in the air, where the alternating fields find a very bad conducting medium the potential vortex not only exists theoretical; it even shows itself. Dependent among others on the frequency and the composition of the surface of the conductor, the potenial vortices form around the conductor. When the thereby induced potentials exceed the initial voltage, then impact ionisation takes place and the well-known corona discharge is produced. Everyone of us can hear this as crackling and see the sparkling skin with which high tension transmission lines cover themselves.
In accordance with the text books also a gradient field increases towards the surface of the conductor, but an even shining would be expected and not a crackling. Without potential vortices the observable structure of the corona would remain an unsolved phenomenon of physics (Fig. 3.6).

But even without knowing the structure-shaping property of the potential vortices, that in addition acts supporting and that we'll have to derive, it can be observed well that especially roughness on the surface of the conductor stimulate the formation of vortices and can produce vortices. If one is looking for a reason why with large frequency the very short impulses of discharge always emerge from roughness<iii>, then very probable potential vortices are responsible for it. By means of a Kirlian photograph it can be shown that the corona consists of structured separate discharges (Fig. 3.6).

With this the approach is motivated, formulated and given reasons for. The expositions can't replace a proof, but they should stand a critical examination. Mathematical and physical evidence will be furnished later.

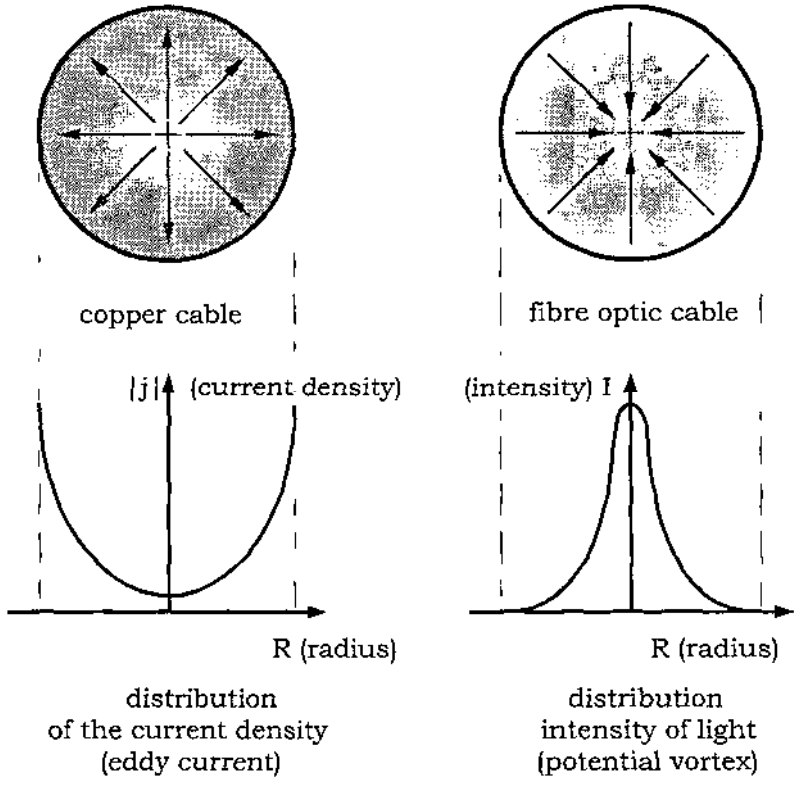


Fig. 4.1: The distribution in principle of the intensity of light within a fibre optic cable<i> compared to the distribution of the current density in a copper cable

<i> Meyl, Konstantin: Potentialwirbel, Band 1: Diskussionsbeitrage zur naturwissenschaftlichen Deutung und zur physikalisch-technischen Nutzung, basierend auf einer mathematischen Berechnung neu entdeckter hydrotischer Wirbel, INDEL GmbH, Verlagsabteilung, Villingen-Schwenningen 1990, ISBN 3-9802-542-1-6

4. Properties

4.1 Concentration effect

It can be assumed that until now there does not yet exist a technical application for the here presented potential vortex theory unless the phenomenon was used by chance and unconsciously. About this the transmission of optical light signals over fibre optic cable can be given as a typical example.
Compared to a transmission of energy impulses over a copper cable fibre optic cables show a considerable better degree of effectiveness. The derived potential vortex theory provides a conclusive explanation for this phenomenon and therefore is put here to discussion: If we cut through a fibre optic cable and look at the distribution of a light impulse over the cross-section, then we observe a concentration in the centre of the conductor (fig. 4.1).

Herc the duality between the vortices of the magnetic and of the electric field comes to light. Whereas the current eddies in a copper conductor cause the "skin effect" as is well-known, potential vortices show a "concentration effect" and align themselves with the vortex centre. The measurable and in fig. 4.1 shown distribution of the light intensity in a fibre optic cable may confirm this phenomenon, the orientation of the potential vortex on the vortex centre.

For instance the calculation of the resistance of a copper cable provides as an important result an apparent decrease of the resistance directed towards the conductor surface. There the associated better conductivity as a consequence causes an increased current density. In the reversed direction, towards the centre of the conductor, consequently a decrease of the effective conductivity would be present, and this result is independent of the used material. According to the rules of duality this is a condition for the formation of potential vortices. As already said the conductivity is responsible for it, if the expanding eddy current with its skin effect or the contracting potential vortex with its concentration effect is predominant.

Usual fibre optic materials possess not only a small conductivity, but in addition a high dieletricity. This additionally favours the formation of vortices of the electric field. If one consciously or unconsciously supports the potential vortices, then there is a possibility that the life of the fibre optic cable is negatively influenced because of the concentration effect. Of course it can not be excluded that other effects, like e.g. reflections or the modes of the light are involved in the concentration effect. But it should be guaranteed that this actually concerns is causal phenomena and doesn't concern only alternative explanations out of ignorance of the active vortex phenomenon.

The formal mathematical reason for the concentration effect provides the reverse sign in Faraday's law of induction compared to Ampere's law (see also equation 3.1 and equation 3.8 in fig. 3.3).

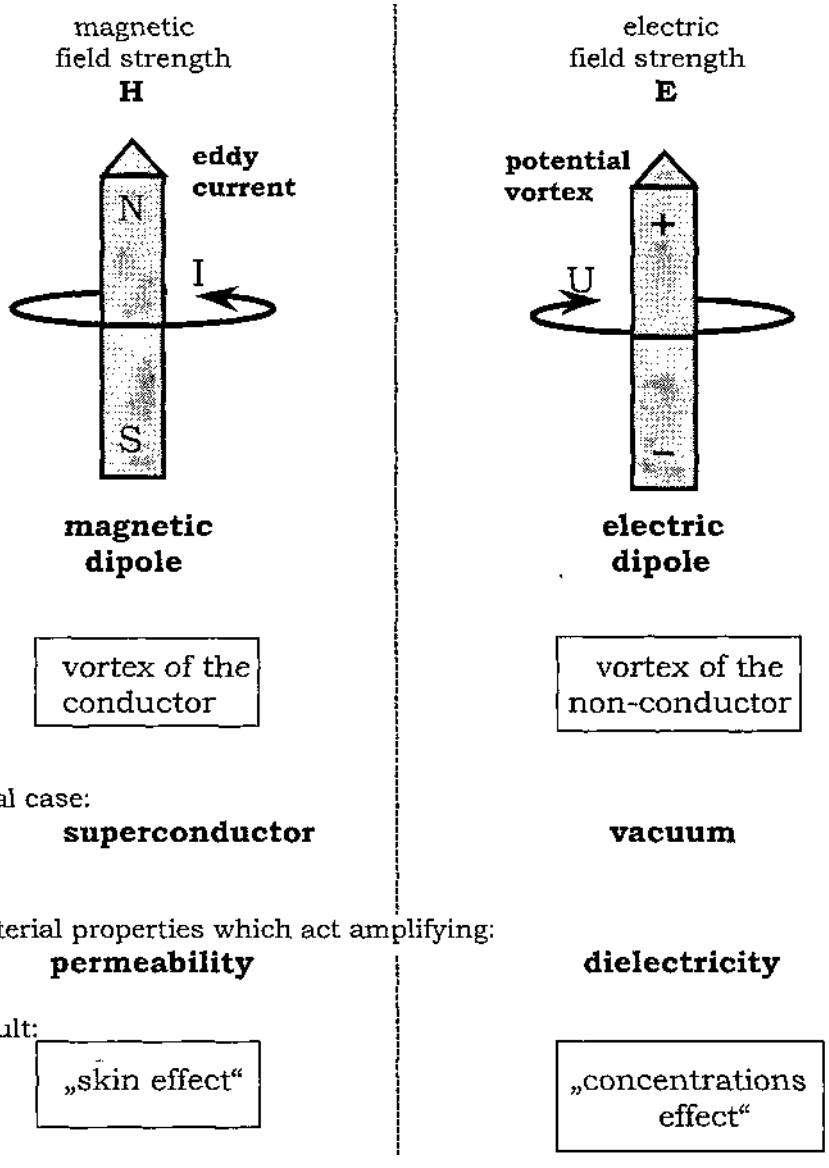


Fig. 4.2: The acting as a dipole of current eddies and potential vortices

4.2 Duality of the vortex properties

The rules of duality dictate for the vortex of the electric and of the magnetic field the following characteristics:

1. Whereas currents and eddy currents demand a good conductivity, potentials and potential vortices can only form with bad conductivity, thus in a dielectric and best in the vacuum.

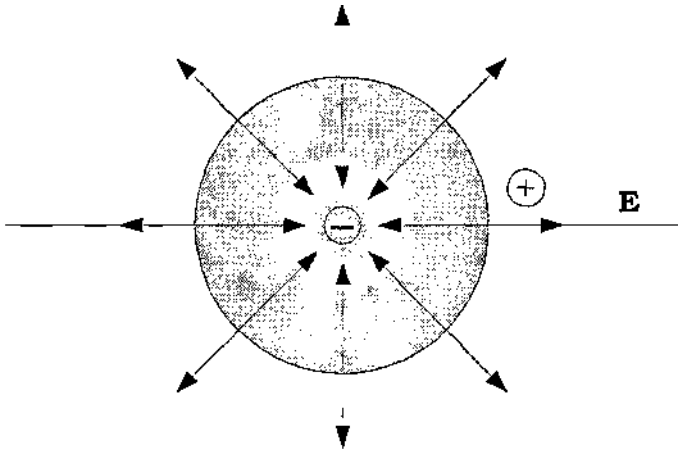
2. Eddy currents run apart, strive towards infinity and thus show the well-known "skin effect" with a spatially limited arrangement of the conductor. According to the rules of duality the potential vortex will strive towards the vortex centre and in this way will show a "concentration effect".

3. Another property of vortices is shown in fig. 4.2.
On the left side a plane eddy current is indicated. Since the discovery of Ampere's law it is well-known to us that such a circular current (I) forms a magnetic dipole standing perpendicular to the vortex plane.
On the right hand side the dual phenomenon is sketched. Here charges are piled up circularly to a planar potential vortex (U). Thereby an electric dipole forms, standing perpendicular to the vortex plane. This relation directly follows from the equations of the field-theoretical approach.
Whereas circular currents and current eddies produce magnetic dipoles, the postulated potential vortices will form electric dipoles.

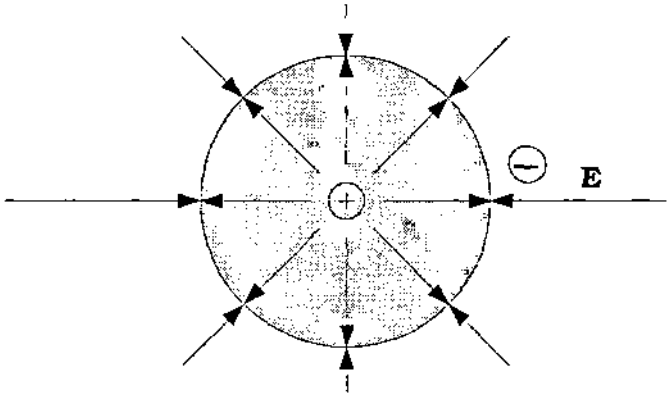
With these three interesting properties some key questions of quantum physics, that until now have stayed a mystery to science (fig. 4.4), can be answered conclusively and without compulsion e.g.:

I. Why are there no magnetically charged particles?
The better the conductivity of a medium is, the higher as a consequence the number of free charge carriers is. the more strongly eddy currents are formed. The answer to question I is inferred from the opposite case:
In the ideal vacuum no charge carriers at all are present, why no currents, no current eddies and consequently no magnetic poles can exist.
With this well-known fact the first question already is answered. The question why in the microcosm there can not exist magnetically charged elementary particles, why the search for magnetic monopoles doesn't make any sense. Let's ask further:

II. Why are there only electrically charged particles?
Let us for that consider the dual conditions. The worse the conductivity of a medium is, the more the potential vortex -will be favoured that because of this property also can be understood as the vortex of the dielectric.
In the mentioned extreme case of the ideal vacuum, no electric conductivity is present for reason of the missing charge carriers. But this circumstance favours the potential vortex and that, according to fig. 4.2, forms electric poles and with this also the second question would be answered clearly.
It can be traced back to the boundary conditions of the microcosm that without exception electrically charged particles are entitled to exist; a realization derived from the field-theoretical approach, that covers all experiences.



the positron e^+



the elektron e^-

Fig. 4.3: Elementarv particles as configurations of potential vortices

4.3 Derivation of the electron as an elementary vortex

The next key question necessarily has to be brought to a conclusive answer to save the principle of causality, so that we no longer have to postulate an own physics with its own laws for the microcosm:

III. Why do these particles show as monopoles?

More concrete the question has to read:
Where is the positive pole in a negatively charged electron, if it should be an electric dipole?
The only possible answer is:
In the centre of the particle!

Thus in the centre of the electron its positive pole is hidden and in the centre of the positron its negative pole is hidden. But we only observe these particles from the outside and for reason of the field conditions of the electron we measure a negative charge and for its antiparticle, the positron, a positive charge. If in each case we wanted to measure the electric fields included in the inside, we had to destroy the particle. Then a proof would not be possible anymore.

Here also a persistent mistake is eliminated by the for a long time known axiom that monopoles can not exist at all if one considers continuity! By means of technical-physical experiments this axiom is sufficiently secured.
The quantum physical approach is standing on uncertain ground if it is postulated that other laws of nature should apply to particle physics, if a second approach, the field-theoretical approach, is conceivable that does not know these problems!

The discussed concentration effect gives the potential vortex a structure shaping property. With that also the fourth key question can be answered:

IV. Why do the particles have the form of spheres?

The potential vortex is favoured in the particle-free vacuum of the microcosm because of the missing conductivity. In connection with the concentration effect the following conclusion can be drawn:
The extremely mighty potential vortex exerts a high pressure on the microcosm and on each particle.

With that also the fourth key question, why stable elementary particles are spherical, can be answered by the potential vortex theory:
Only the sphere is able to withstand a high outside pressure.
All other forms, like e.g. dipoles formed like a rod or a club would be instable in the presence of the extremely concentrating potential vortex. They would be immediately destroyed by the pressure of the potential vortex.

I. Why are there no magnetically charged particles?
(the vacuum has no conductivity!)

II. Why are there only electrically charged particles?
(in the vacuum only potential vortices can exist!)

III. Why do these particles show as monopoles?

(the other pole is locked up in the inside of the vortex oscillation!)

IV. Why do the particles have the form of spheres?

(for reason of the outside pressure by the concentration effect!)

V. Why is the elementary quantum stable?

(without conductivity no decay of vortices takes place!)

VI. Why does for every particle of matter exist an antiparticle?

(there are two swirl directions with equal rights!)

VII. Why are particles and antiparticles incompatible?
(contrary swirl directions!)

Fig. 4.4: Key questions of quantum physics

4.4 Quanta as field vortices

The fied-theoretical approach demands removing the electron from the field equations (eq. 3.7) and at the same time introducing the potential vortex of the electric field. With this vortex phenomenon there now is a possibility that the electromagnetic wave spontaneously rolls up to a vortex in case it is disturbed from the outside. The vortex particle that is formed in such a way owes its physical reality on the one hand the concentration effect of the potential vortex, that compresses this particle to the dimension of a tiny sphere and on the other hand its localization for reason of the oscillation around a fixed point.
The sphcrical elementary particles are being compressed to inconceivably small dimensions. Therefore they are capable to bind a comparatively high energy in their inside. This is confirmed by the mass-energy relation $E = mc^2$. (4.1)

The fact that the energy is dependent on the speed of light can be judged to be a clear indication that quanta actually are nothing but oscillating electromagnetic packages, vortical oscillations of empty space!
The next question reads:

V. Why is the elementary quantum stable?
The worse the conductivity is, the more the potential vortex will be favoured, the more strongly the concentration effect will form, the smaller the spherical phenomena will get - the larger the authoritative relaxation time will be, i.e. the slower the decay of vortices and with that the more stable the vortex phenomenon will be.
In the microcosm, that comes the ideal case of a particle-free vacuum very close, the spherical vortices because of the missing conductivity have an absolute stability.

VI. Why does for every particle of matter exist an antiparticle?
Since every vortex can also oscillate
in the opposite direction, there always exist two forms of formation of spherical vortices with equal rights, one of them is assigned to the world of matter and the other to the world of anti-matter.

VII. Why are particles and antiparticles incompatible?
For reason of the contrary swirl direction they are incompatible to each other. They have the tendency to destroy each other mutually, like two trains that want in the opposite direction on a single-tracked distance.

The quantum physical approach does not have an answer to these key questions. Until now scientists have merely thought about to what the observable contraction in the microcosm and the macrocosm can be traced back. Because the approach was not able to furnish an answer, without further ado some new matter was introduced: the sluons. These binding particles should be able to exert the necessary pressure. But until now no one has been able to observe or detect this fabulous matter. Nobody knows its structure and its composition. Despite missing evidence it is stated that this matter is mass less and at the same time lumped; it is invisible because it can't interact with any other matter, not even with the supposed building parts of the atomic nuclei, the quarks. But at the same time there should be exerted a pressure on the quarks, for which reason quarks again should be able to interact with gluons!

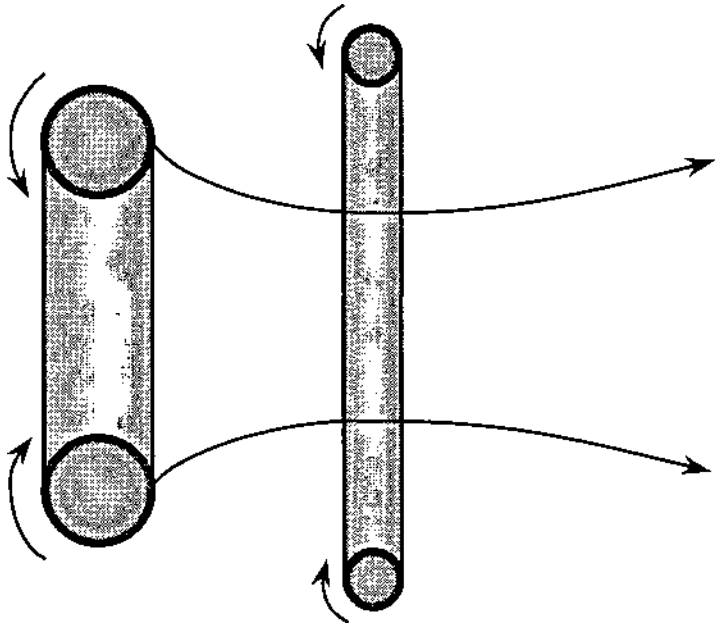


Fig. 4.5: Two coaxial oscillating vortex rings (Lugt[<i>]).

<i> Lugt, Hans J.: Vortex flow in nature and technology. Krieger publishing company, Florida 1995; page 42, ISBN 0-89464-916-7

4.5 The photon

The ability to form structures as a consequence of the concentration effect gives the potential vortex a number of highly interesting properties. To derive these properties we can make work easier when we fall back upon the observations and experiences of flow dynamics.
Here the vortex ring takes a special place. Its vortex centre is not closed, for which reason it is not stationary and propagates in space with a constant speed. It can be observed that the velocity of propagation increases with the ring diameter becoming smaller. By means of the vortex rings, that skilful smokers can produce with pointed lips, these properties can be made visible.
Now if two vortex rings run into each other with the same axis and direction of rotation then both oscillate around each other, by one vortex attracting the other vortex, thereby accelerating and thus contracting it. The second vortex then slips through the core opening and gets again slower and larger. Now the first vortex accelerates and plays the same game (fig. 4.5).
It would be obvious for the vortex of the electric field to have a corresponding property. The electron e- and with the opposite swirl direction the positron e+ will form such a potential vortex corresponding to the derivation. Two electrons, as like charged particles, would repel each other and surely will be out of the question for such a configuration. An electron and a positron however will attract each other and because of their incompatibility they will mutually destroy unless they open their vortex centres to form a vortex ring. Now the e- shows its positively charged centre that shows the same swirl direction as the e+ seen from the outside. Therefore the vortices don't hurt each other, when the positron slips through the opened vortex centre of the electron and vice versa.
This oscillating electron-positron pair has strange properties: seen from the outside one moment it is negatively charged and the next moment it is positively charged. Therefore over time on the average no charge will be measurable and no electromagnetic interaction will take place.
One moment the particle is matter and the next moment it is anti-matter. Hence no mass at all can be attributed to the particle. Interactions primarily takes place between both dual vortices. We can predict, the particle has neither mass nor charge. The environment merely sees a fast oscillating particle that only within every half cycle is capable of an interaction.
The centre of the oscillating particle is open, for which reason it is not stationary anymore. Instead it propagates in z-direction with the swirl velocity, which is the speed of light, in this way preventing a rotation around the x- or y- axis (fig. 4.6). In this way a polarizability is present.
The only possible and, as we will see, necessarily taking place rotation around the z-axis gives the particle a spin of the magnitude of a quantum of angular momentum. After all the rotation for e^- and e^+ is of the same magnitude with a spin of each time $\frac{1}{2} \cdot \hbar$. There should be paid attention to the fact that for the case of an opposite sense of direction of the respective rotation around the common z-axis the spin on the average will be zero.
In addition the particle is characterized by an outstanding property: a periodically taking place oscillation with any frequency, but that frequency has to be constant.
We now only have to take a table of particles to hand. Actually we will find a corresponding particle that has all these properties: the γ-quanta, also called photon.

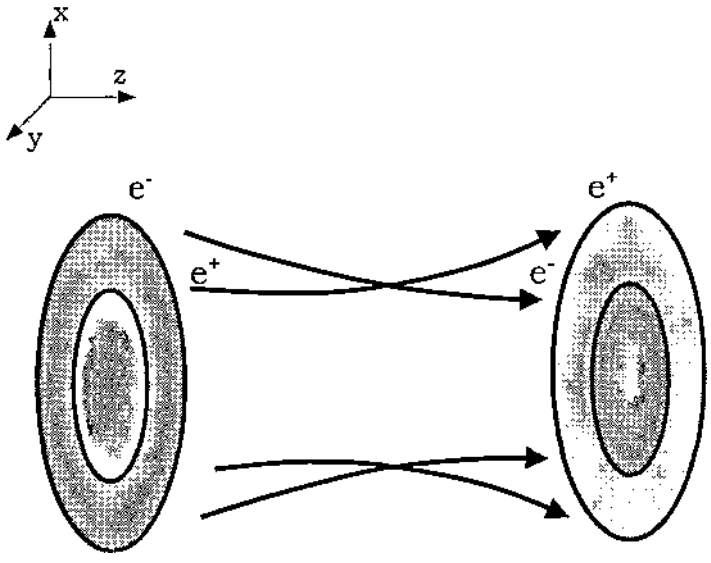


Fig. 4.6: The photon as oscillating electron-positron pair

The decay of the γ- quanta (photon)[<i>]
(= pair creation = Bethe-Heitler-process 1934):

$$\gamma \longrightarrow e^- + e^+ \quad (4.2)$$

<i> Nachtmann, Otto: Phanomene und Konzepte der Elementarteilchenphysik, Vieweg, Braunschweig 1986, S. 135, ISBN 3-528-08926-1

4.6 Pair creation

Proof for the correctness of the model concept provides the decay of the photon in an electron and a positron in the presence of a strong field, as for instance in an atomic nucleus. This observable decay is called pair creation or Bethe-Heitler process[<i>]:

$\gamma \longrightarrow e^- + e^+$ (4.2)

In this process the elementary vortices for a short time get back their localization and are therefore detectable. Otherwise the electron and positron have the form of a sphere, the photon however rather has the form of two oscillating discs.

The photon doesn't participate in the electromagnetic interaction, because the electric field lines run from one disc to the other (from + to -). The field lines are not open as they are for e^- or e^+ (fig. 4.3). To open up the field lines an energy is necessary that corresponds to the sum of the two formed particles. But from this it by no means follows that this amount of energy will be released in the reversed and much better known process, where matter and anti-matter annihilate under emission of γ-quanta. At the end of the derivation the vortex model will provide us the desired answers on questions of the energy of photons.

Here first of all only the properties will be concerned. Experiments, in which light shows as a particle, are the photoelectric effect, the Compton effect and a lot more. According to the by Maxwell developed classical theory of light however is light an electromagnetic wave that is not quantized in any way, neither as sphere nor as disc, the wave nature of light as well has a physical reality and is secured by experiment. This is witnessed by the interference patterns of overlapping coherent light beams.

A concept in which light could exist at the same place and the same time both as wave and as corpuscle could never be brought into accord with the principle of causality. Formulas of compromise, like the uncertainty principle of Heisenberg that refers to the point of view of the observer, can't change anything about this dilemma. The dual nature of light, that in this context is gladly spoken of, rather consists of the fact that dependent on the local field conditions, any time and spontaneously the wave can roll up to a vortex.

As an example of a violation of the principle of causality it has been indicated under point 3 (fig. 3.1) that both fields and quanta at the same time should be the cause of something. This concept was formulated by Maxwell and written down in modern quantum electro-dynamics by Dirac but in the field-theoretical approach we have dropped this concept because it violates all rules of causality in an elementary manner. Therefore it only is consistent, if we hold the view that the light is either wave or particle but never is both at the same time!

In the spontaneous transition of the wave to the particle all the important properties are conserved: the propagation with the speed of light, the characteristic frequency of the oscillation and the mentioned polarizability.

The process of rolling up possibly takes place already in the laboratory, in a bubble chamber and at the latest in our eyes. To receive the electromagnetic wave, we had to have antennas. We actually see the photons. It therefore would be obvious if our cells to see only could perceive vortices, in this case photons. We don't possess a sense organ for fields and waves.

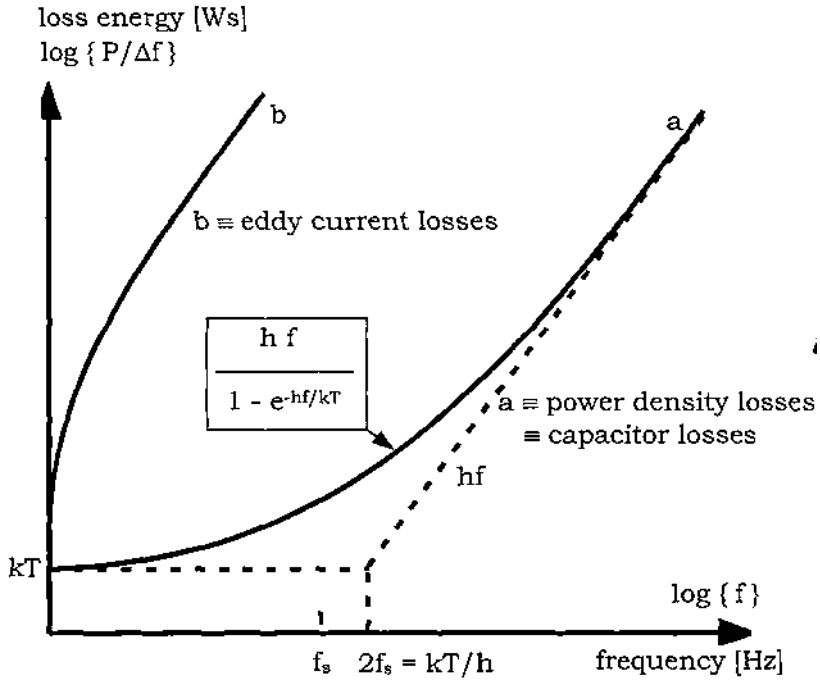


Fig. 4.7: The power density shown against frequency for noise
(a) according to Kupfmuller<i>,
as well as for dielectric losses of a capacitor (also a) and for eddy current losses (b) according to Mevl<ii> (b in visible duality to a).

<i> Kupfmuller, Karl: Einfuhrung in die theoretische Elektrotechnik, Springer-Verlag Berlin, 12. Auflage 1988, ISBN 3-540-18403-1
<ii> Meyl, Konstantin: Dreidimensionale nichtlineare Berechnung von Wirbelstromkupplungen, Dissertation Universitat Stuttgart 1984

4.7 Noise

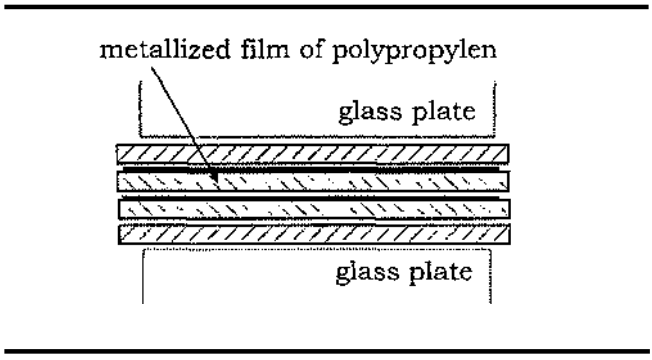
If, according to the field-theoretical approach, there exist electric field vortices then they will not only form the elementary particles in the vacuum, but will also macroscopically form and have an effect in larger dimensions.

Assuming a wave that rolls up to a plane vortex it would be obvious if polarization and velocity of propagation are conserved in the process. But how does it stand about the frequency?
The wave now will walk round a stationary point, the vortex centre. The propagation with the speed of light c will remain existent as the swirl velocity. For a plane circular vortex, where the path for a revolution on the outside is very much longer than near the vortex centre, there arises a longer wave length and as a consequence a lower frequency on the outside as more to the inside. With this property the vortex proves to be a changer of frequency: the vortex transforms the frequency of the causing wave in an evenly spectrum, that starts at low frequencies and stretches to very high frequencies (fig. 1.4). Exactly this property we observe in "white noise". The consistent conclusion would be that this concerns the vortex of the electric field. Anyone can, without big expenses, convince himself or herself of the localization, of the property to change the frequency and of the circumstance that vortices can be very easily influenced, that they avoid or again whirl about a place of disturbance, for instance an antenna. For that one only needs to tune a radio receiver to a weak and noisy station and move oneself or some objects around, then one is able to directly study the influences from the manipulation of the receiving signal.
But already the fact that the using and measurability of signals is limited by noise makes clear. which attention the potential vortex should be given.

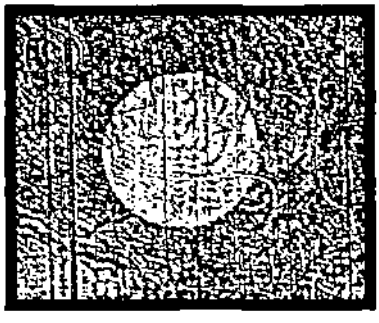
Within a limited frequency range the power of the Nyquist or resistance noise is independent of frequency (fig. 4.7). This should be clarified particularly by the term "white noise" analogous to white light, where all visible spectral ranges independent of frequency have the same energy density.

But this relation doesn't hold for high frequencies of any magnitude. Here another noise-effect appears, that is said to have its cause in the quantum structure of energy<i>. Untouched by possible interpretations an increasing power of the noise is measured, that more and more turns into a being proportional to frequency (fig. 4.7, curve a). Interestingly this curve shows a remarkable duality to the power curve of eddy currents, likewise shown against the frequency, that for instance can be measured at eddy current couplings<ii> (fig. 4.7, curve b). This circumstance suggests a dual relation of the potential vortex of the electric field in bad conducting media on the one hand and the eddy current in inductive materials on the other hand <iii>.

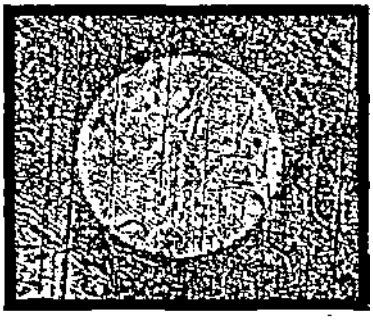
<iii>: Meyl, Konstantin: Wirbel des elektrischen Feldes,
EMC Journal 1/95, 6. J, ISSN 0945-3857, S. 56 - 59.



a) measurement set up according to Yializis and others<i>



b) after 40 hours



c) after 52 hours

Fig. 4.8: Measurement set up (a) and photo of vortex structure
in a metallized polypropylen layer capacitor (at 450 V/ 60 Hz/ 100°C)
Observation of the formation of a vortex (b) and (c). (110 fold magnification), according to Yializis et al.<i>

<i>: A. Yializis, S. W. Cichanowski, D. G. Shaw: Electrode Corrosion in Metallized Polypropylene Capacitors, Proceedings of IEEE, International Symposium on Electrical Insulation, Bosten, Mass., June 1980;

4.8 Capacitor losses

Next the dielectric losses in a capacitor fed with an alternating voltage are measured and likewise put on against the frequency. At first the course is independent of the frequency, but towards higher frequencies it increases and shows the same characteristic course of the curve as the before mentioned power of the noise (fig. 4.7, curve a).

This excellent agreement suggests the assumption that the dielectric losses are nothing but eddy losses.
These vortex phenomena, caused by time-varying fields, are not only found in ferro-magnetic and conductive materials, but equally as dual phenomena in dielectrics and non-conductors.

As examples of practical applications the induction welding or the microwave oven can be mentioned. The process can be described in other words as follows: in both examples the cause is posed by high-frequency alternating fields that are irradiated into a dielectric as an electromagnetic wave, there roll up to potential vortices and eventually decay in the vortex centre. The desired and used thermal effect arises during this diffusion process.

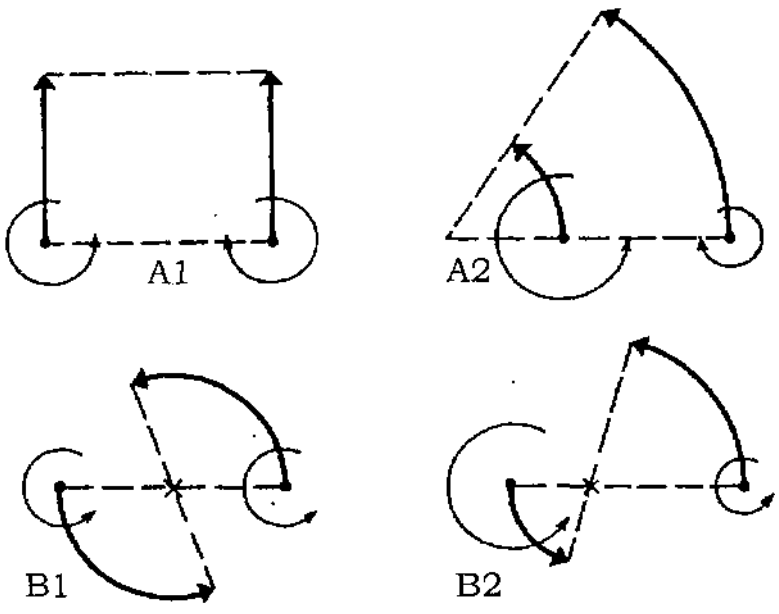
The striving in the direction of the vortex centre gives the potential vortex of the electric field a structure shaping property. As a consequence of this "concentration effect" circular vortex structures are to be expected, comparable to the visible vortices in flow dynamics (e.g. tornados and whirlwinds). At the same time the dual anti-vortex arises, the diverging eddy current. It takes, as is well-known, the given structure of the conductor, so in the technical literature one correspondingly talks of a "skin effect". Now if conductor and non-conductor meet as they do in a capacitor, then at the boundary area visible structures will form. Circles would be expected, if the eddy current in the inside and striving to the outside is equally powerful as the potential vortex that comes from the outside and concentrates.

Actually such circular structures are observed on the aluminium of high tension capacitors, when they were in operation for a longer period of time. The formation of these circles, the cause of which until now is considered to be unsolved, is already experimentally investigated and discussed on an international level by scientists (fig. 4.8) <i, ii>.

These circular vortex structures can be seen as a visible proof <iii> for the existence of potential vortices of the electric field.

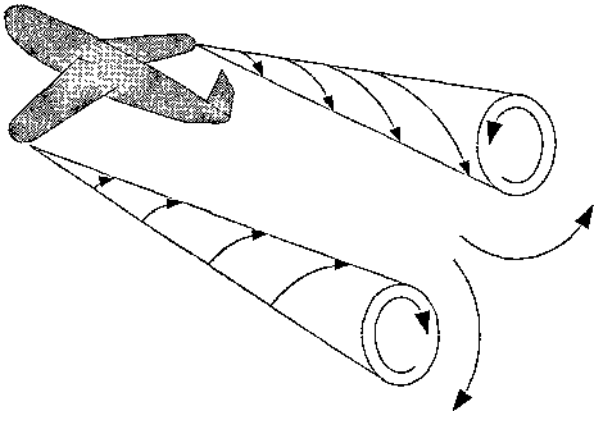
<ii>: D. F. Taylor, On the Mechanism of Aluminium Corrosion in Metallized Film Capacitors, IEEE Transactions on EI-19,August 1984,No.4,pp.288-293.

<iii>: Meyl, Konstantin: Wirbel des elektrischen Feldes, EMC Journal 1/95, 6.J, ISSN 0945-3857, S. 56-59.



Fig, 4.9: Motion of two point vortices. (Lugt[<i>])
A. with opposite direction of rotation
B. with the same direction of rotation
1. for equal vortex strength
2. for unequal vortex strength

Example from practice for case Al:
vortex pair behind an airplane



4.9 Vortex lines and vortex streets

It can be assumed that the vortex of the electric field is relevant with regard to the electromagnetic environmental compatibility. This then holds not only for microcosmic and microscopic vortices, but also for macroscopic and larger dimensions. The individual vortices can join together to balls and lines. For the study of this process it is useful to again fall back upon experiences of flow dynamics.

The co-operation of individual point vortices has been investigated thoroughly in flow dyamics. Without any outside manipulation an individual vortex rotates on the spot. That changes in the case of two neighbouring vortices. Now it depends on their mutual strength and sense of rotation. If they have the opposite sense of rotation and equal strength then their centres of rotation move straight forward in the same direction. If however the direction of rotation is the same then both vortices rotate around each other (fig. 4.9).

In this way a multitude of point vortices is capable, to form in the first case whole vortex streets and in the second case spherical vortex balls. In principle a vortex string can also consist of a multitude of potential vortices pointing in the same direction; but it has the tendency to roll up to a vortex ball in case it is disturbed from the outside, as can be shown very clear by means of computer simulations[<i>].

As a starting-point for a discussion the thesis can be put forward that also electric field vortices, in nature usually consisting of a multitude of individual point vortices, appear as vortex strings and vortex balls.

Perhaps historians see in this property an answer to the question, how it was possible for the Romans to build streets straight as a die in the wilderness. Their land surveyors, the Augures, had at their disposal neither laser, nor any other suitable gauges. Their most important tool was the Lituus, the crook, that at its upper end was rolled up like a vortex in the sense of a flat coil shaped like a spiral.
The question poses what this strange object was used for. Perhaps the roman land surveors tracked down any vortex lines with this crook and then used them to orientate themselves?
History still holds a lot of secrets, but for now only this indication is given. The following seminar will give enough opportunities for speculations and discussions[<ii>].

<i>: Lugt, Hans J.: Vortex flow in nature and technology. Krieger publishing company, Florida 1995; p.38, fig. 3.25, 3.26 and 3.27, ISBN 0-89464-916-7

<ii>: K. Meyl: Elektromagnetische Umweltvertraglichkeit Teil 2 und 3 Seminar-umdrucke, INDEL Verlag VS; see part 2 and 3 of this book.

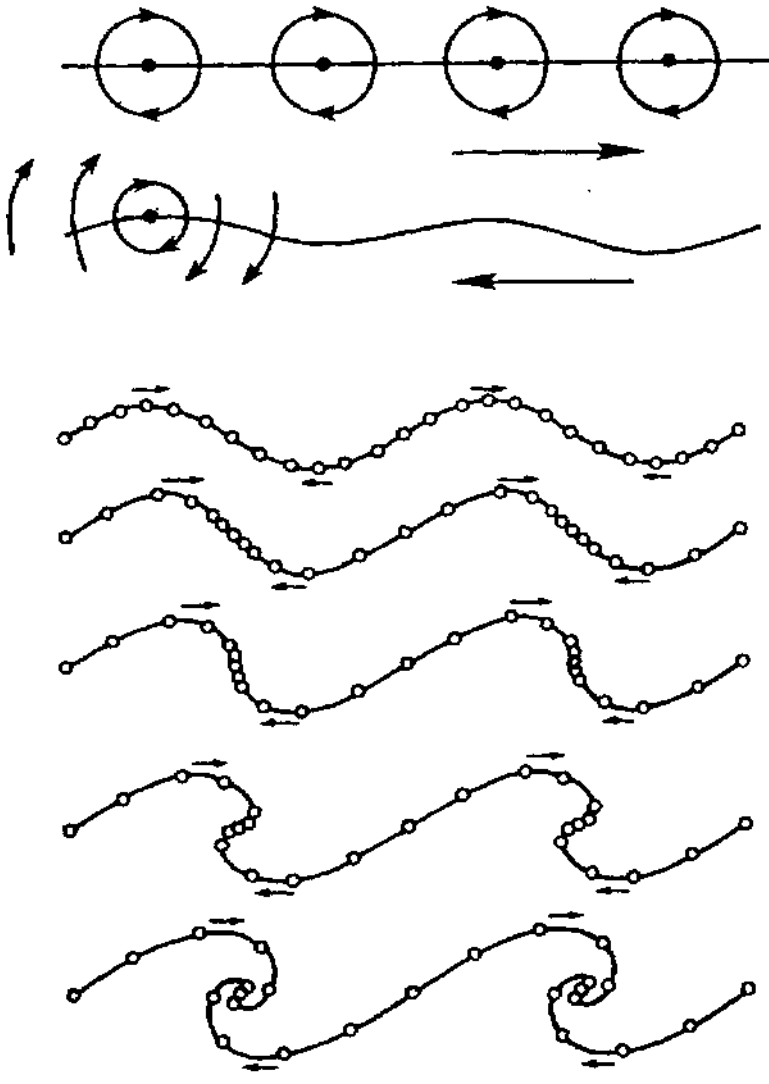


Fig. 4.10: The rolling up of a vortex chain to a vortex ball for the smallest disturbance
(case Bl in fig. 4.9) (Rosenhead<i>).

<i>: L. Rosenhead: Formation of vortices from a surface of discontinuity. Proc. Roy. Soc. A 134, 1931, 170. taken from:

Lugt, Hans J.: Vortex flow in nature and technology. Krieger publishing company, Florida 1995; page 39, figure 3.29, ISBN 0-89464-916-7

4.10 Water colloids as vortex balls

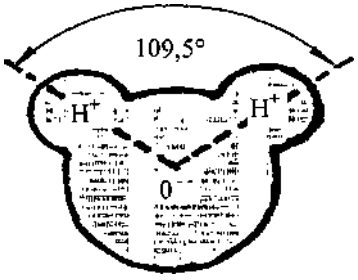
We have to realize that in the biosphere we are staying in a relatively ideal dielectric. The two "capacitor plates" are being formed by the ionosphere and the earth. The potential vortex will, as said, be favoured by a bad conductivity and by a high dielectricity. Consequently it will dominate and take effect in the biosphere. In which way it takes effect is the central theme of the electromagnetic environmental compatibility.

Life in this world consists predominantly of water and water has a very high dielectricity! With that the effectiveness and the long life of the potential vortex increases. The human head for instance contains 7O% and plants contain over 90% water! But it does not simply concern H_2O, but structured water in a colloidal form. These water colloids could be vortex balls because they consist of a large number of water molecules in a spherical arrangement They form independent and insoluble particles with a negative electric charge (fig. 4.11).
Water is not equal water thanks to this structure. One can buy healing water and corresponding sources are well-known and famous. Many an effect can be explained by means of a chemical analysis but not everything.

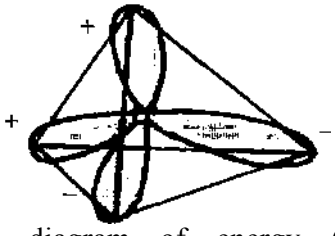
The highest age in this world is reached by the inhabitants of Hunza, in the mountains of norhern India at the foothill of the Hindu Kush, at an altitude of 2500 meters. They drink some muddy glacial water that is strongly colloidal. Hence it would be obvious that plants and also we ourselves need such water for our physique. Processes are known with which the advantageous vortex balls, say colloids, are produced artificially by mechanic or chemical treatment<i>. Levitated water, as it is called and as it is for sale nowadays, is said to be more healthy. Unfortunately people predominantly work empiric in this area, because science occupies itself with this topic only little or not at all.
Another problem is the fact that the colloids again fall apart quickly. The like negative charge favours this process. The liquid crystals have to be stabilized from the outside. In the case of the Hunza-water the colloids are surrounded by a vegetable layer of fatty acid and are protected in this way <ii>. It possibly is very obliging to nature, if the water colloids also in biological systems are stabilized in that way.
Everyone of us knows that fresh spring water tastes much better than stale, bottled water, even if the chemical analysis turns out of be absolutely identical. For this fact classical science is not able to give a cause - a further problem of causality. In any case should potential vortices with their structure shaping property be considered as a cause for the formation of water colloids. It surely causes no difficulties at all to interpret the colloids as vortcx bulls.

<i>: V. Schauberger: Die Entdeckung der Levitationskraft, Implosion 1995 Nr. 112 und:
N. Harthun: NaturgemaSe Technik - Wege fur die Forschung nach Viktor Schauberger, Verlag Delta Design, Berlin 1996.

<ii>: Flanagan: Elexier der Jugendlichkeit, Waldthausen Verlag Ritterhude 1992, orig.: Elixir of Ageless



H_2O: the angle of the bond between 2 H molecules = 104,5°
angle of the bond in excited state = 109,5°



electron orbital diagram of energy (excited H_2O) = tetraeder
most stable liquid crystal = 8 tetraeder = star of octaeder

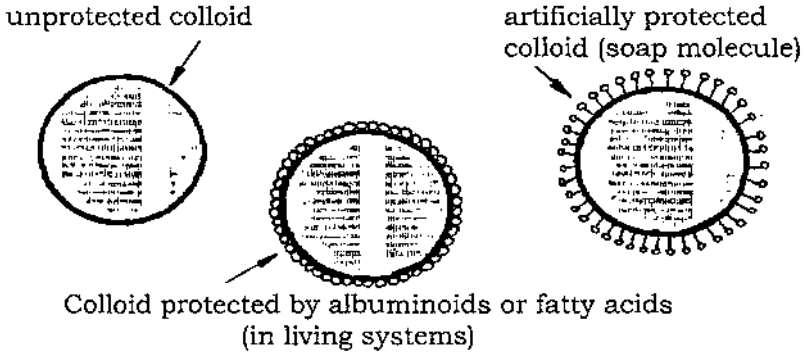

unprotected colloid
artificially protected colloid (soap molecule)
Colloid protected by albuminoids or fatty acids (in living systems)

Fig. 4.11: Water molecules and water colloids

4.11 Phenomenon of transport

The vortex principle is self-similar. This means that the properties of an individual vortex also for the collection of numerous vortices again appear and can he observed in a similar manner. That's why a vortex ball behaves entirely similar as an individual isolated vortex. The same concentration effect, that keeps the vortex together, shows its effect for the vortex ball and keeps it together also.

Something corresponding holds for a basic property of potential vortices, being of a completely different nature. It is the property to bind matter in the vortex and carry it away with the vortex. Well-known are the vortex rings that skilful cigarette smokers can blow in the air. Of course also non-smokers can produce these air eddies with their mouth but these remain invisible. Solely by the property of the vortex ring to bind the smoke it becomes visible to the human eye.

If out potential vortex transports something then it rather should be a dielectric material, so preferably water. Therefore if in the environmental air we are surrounded by potential vortices that we can detect for instance as noise, then they are capable with their "phenomenon of transport", to pick up water and to keep it in the vortex. In this way the atmospheric humidity is explicable as the ability of the air particles to bind comparatively heavy water molecules. If the vortex falls apart then it inevitably releases the water particles and it rains. This is merely a charming alternative for the classical representation without claim to completeness.

Already the Romans have made use of this phenomenon to find water and sources. About this Vitruv<i> (from 23 BC) in his 8th book about architecture writes: "Before sunrise one has to lie down on the earth at the places, where to search for water,... and one has to look at the area... Then one has to dig at the place where there appears curling and in the air rising moist steam. Because this characteristic can not occur at a place where there is no water". The at a certain time of day and in certain seasons occasional in meadows and corn fields observable streaks or circular mostly moist places with differing vegetation, have to be judged as an infallible sign for the existence of this phenomenon.

This phenomenon of transport again appears for the discussed water colloids. The involved water molecules form a spherical object with a negative charge. They turn their negatively charged side to the outside and point with the positively charged end in the direction of the middle of the sphere. There, no longer discernible from the outside, a negatively charged ion can be, that is stuck, that no longer can escape and that gives the whole colloid a characteristic property. In this way nature knows various water colloids that constitute plants and animals. But starting at a temperature of 41°C the liquid crystals fall apart. This not by chance is the temperature at which a person dies. Already 10 millivolts per liquid crystal suffice for the electrically induced death.

The to a colloid identical structure we find in the structure of the atoms. Here the atomic nucleus is held in the inside of a vortex-like cloud of electrons, the atomic hull. We'll hit the phenomenon of transport a last time, when we derive the elementary particles. For the photon is already discernible the tendency of an elementary vortex, to take another vortex in its inside. Merely because the electron and positron are evenly matched a stable configuration is prevented for the photon.

<i>: Vitruvius Pollio, Marcus: Ten Books about architecture, WBG 1987

In chapter vortex calculation used differential operations:

field pointer (vector = **bold**):

$$\mathbf{A} = \mathbf{e}_x \cdot A_x + \mathbf{e}_y \cdot A_y + \mathbf{e}_z \cdot A_z$$

Gradient of the scalar function of position V:

$$\text{grad } V = \mathbf{e}_x \cdot \delta V/\delta x + \mathbf{e}_y \cdot \delta V/\delta y + \mathbf{e}_z \cdot \delta V/\delta z \qquad \text{(R1)}$$

Divergence of the vector **A**:

$$\text{div } \mathbf{A} = \delta A_x/\delta x + \delta A_y/\delta y + \delta A_z/\delta z \qquad \text{(R2)}$$

Curl (vortex density) of the vector **A**:

$$\begin{aligned} \text{rot } \mathbf{A} = {} & \mathbf{e}_x \cdot (\delta A_z/\delta y - \delta A_y/\delta z) + \\ & + \mathbf{e}_y \cdot (\delta A_x/\delta z - \delta A_z/\delta x) + \\ & + \mathbf{e}_z \cdot (\delta A_y/\delta x - \delta A_x/\delta y) \end{aligned} \qquad \text{(R3)}$$

Laplace operator Δ:

$$\Delta \mathbf{A} = \delta^2\mathbf{A}/\delta x^2 + \delta^2\mathbf{A}/\delta y^2 + \delta^2\mathbf{A}/\delta z^2 \qquad \text{(R4)}$$

arithmetic rules:

$$\Delta \mathbf{A} = \text{grad div } \mathbf{A} - \text{rot rot } \mathbf{A} \qquad \text{(R5)}$$

$$\text{div rot } \mathbf{A} = 0 \qquad \text{(R6)}$$

$$\mathbf{A} \times \mathbf{B} = -\mathbf{B} \times \mathbf{A} \qquad \text{(R7)}$$

$$\text{div } (\mathbf{A} \times \mathbf{B}) = \mathbf{B} \text{ rot } \mathbf{A} - \mathbf{A} \text{ rot } \mathbf{B} \qquad \text{(R8)}$$

$$\text{rot } (\mathbf{A} \times \mathbf{B}) = (\mathbf{B} \text{ grad})\mathbf{A} - (\mathbf{A} \text{ grad})\mathbf{B} + \mathbf{A} \text{ div } \mathbf{B} - \mathbf{B} \text{ div } \mathbf{A} \qquad \text{(R9)}$$

$$\mathbf{A} \times (\mathbf{B} \times \mathbf{C}) = \mathbf{B} \cdot (\mathbf{A} \cdot \mathbf{C}) - \mathbf{C} \cdot (\mathbf{A} \cdot \mathbf{B}) \qquad \text{(R10)}$$

* important equations are given in a box
* new equations are underlined twice.

Fig. 5.0: Collection of formulas for vector analysis

5. Derivation and interpretation

Vortices cause big problems to every measuring technician. They have the unpleasant property to whirl around the sensor even if it is as small as possible. Vortices avoid the smallest disturbance and then can hardly be detected reproducibly.

From the well-known eddy current we know of this problematic. Instead of the vortex, we are forced to measure and analyse any effects that arise from the vortex. These can be measurements of the eddy losses or effects back on the stimulating field. But only provided that the effect actually occurs.
The prerequisite for an increase in temperature by eddy losses is that the vortex falls apart. In an ideal medium it unfortunately will not do us this pleasure.

As vrtex of the dielectric the potential vortex will find fairly ideal conditions in air or in water. How should a vortex be detected, if it does not produce any effect? The classical measuring technique is here at its wits' end.

From the duality to the well-known eddy current and by means of observation in the previous chapters numerous properties of the potential vortex have been derived. But these are not all the properties. The mathematical calculation of the electric vortex field, that we want to turn to now, will reveal still further meaningful and highly interesting properties.

The observation is important, but it can't replace an exact calculation. A strictly mathematical derived result has occasionally more expressiveness than a whole book full of explanations. It will be a big help to derive and to discuss the field equation that all considerations are based on.

We facilitate the mathematical work by vector analysis. Therefore it is useful that we choose the differential form (equation 5.1 and 5.4) instead of the integral form (equations 3.1 and 3.2 resp. 3.8).

1. Ampère's law:

$$\text{rot}\,\mathbf{H} = \mathbf{j} + \delta\mathbf{D}/\delta t \qquad (5.1)$$

with $\mathbf{H} = \mathbf{H}(\mathbf{r},t)$

and Ohm's law: $\mathbf{j} = \sigma \cdot \mathbf{E}$ (5.2)

dielectric displacement: $\mathbf{D} = \varepsilon \cdot \mathbf{E}$ (3.6)

relaxation time: $\tau_1 = \varepsilon/\sigma$ (5.3)

$$\boxed{\text{rot}\,\mathbf{H} = \varepsilon \cdot (\mathbf{E}/\tau_1 + \delta\mathbf{E}/\delta t)} \qquad (5.1^*)$$

2. Faraday's law of induction (extended according to duality rules)

$$-\text{rot}\,\mathbf{E} = \mathbf{B}/\tau_2 + \delta\mathbf{B}/\delta t \qquad (5.4)$$

with $\mathbf{E} = \mathbf{E}(\mathbf{r},t)$

and the flux density: $\mathbf{B} = \mu \cdot \mathbf{H}$ (3.5)

$$\boxed{-\text{rot}\,\mathbf{E} = \mu \cdot (\mathbf{H}/\tau_2 + \delta\mathbf{H}/\delta t)} \qquad (5.4^*)$$

$$-\text{rot rot}\,\mathbf{E} = \mu \cdot (1/\tau_2) \cdot \text{rot}\,\mathbf{H} + \mu \cdot \delta(\text{rot}\,\mathbf{H})/\delta t \qquad (5.5)$$

insert equation 5.1*:

$$-\text{rot rot}\,\mathbf{E} = \mu \cdot \varepsilon \cdot (\mathbf{E}/\tau_1\tau_2 + (1/\tau_2) \cdot \delta\mathbf{E}/\delta t + (1/\tau_1) \cdot \delta\mathbf{E}/\delta t + \delta^2\mathbf{E}/\delta t^2) \qquad (5.5^*)$$

$$-\text{rot rot}\,\mathbf{E} = \Delta\mathbf{E} - \text{grad div}\,\mathbf{E} = \Delta\mathbf{E}\,, \qquad (R5)$$

if: $\text{div}\,\mathbf{E} = 0$ (3.7*)

abbreviation: $\mu \cdot \varepsilon = 1/c^2$ (5.6)

3. fundamental field equation:

$$\underbrace{\Delta\mathbf{E}\cdot c^2}_{a} = \underbrace{\delta^2\mathbf{E}/\delta t^2}_{b} + \underbrace{(1/\tau_1)\cdot\delta\mathbf{E}/\delta t}_{c} + \underbrace{(1/\tau_2)\cdot\delta\mathbf{E}/\delta t}_{d} + \underbrace{\mathbf{E}/\tau_1\tau_2}_{e} \qquad (5.7)$$

Fig. 5.1: Derivation of the fundamental field equation.

5.1 Fundamental field equation

We'll start from Ampere's law which provides a value for the current density at any point pace and this value corresponds to the vortex density of the magnetic field strength

$$\text{rot } \mathbf{H} = \mathbf{j} + \delta \mathbf{D}/\delta t \qquad (5.1)$$

We'll use Ohm's law: $\mathbf{j} = \sigma \cdot \mathbf{E}$. (5.2)

the dielectric displacement: $\mathbf{D} = \varepsilon \cdot \mathbf{E}$ (3.6)

and the relaxation time: $\tau_1 = \varepsilon/\sigma$, (5.3)

that indicates how fast the current eddies decay. So far we can fall back upon well-known relations.

The result is:

$$\boxed{\text{rot } \mathbf{H} = \varepsilon \cdot (\mathbf{E}/\tau_1 + \delta \mathbf{E}/\delta t)} \qquad (5.1^*)$$

The new electric field vortices demand the introduction of a corresponding time constant τ_2 that should describe the decay of the potential vortices, as an extension. The extended Faraday law of induction now provides a potential density, that at any point of space corresponds to the vortex density of the electric field strength:

$$-\text{rot } \mathbf{E} = \mathbf{B}/\tau_2 + \delta \mathbf{B}/\delta t \qquad (5.4)$$

with the flux density $\mathbf{B} = \mu \cdot \mathbf{H}$. (3.5)

The result fulfils the required duality to equation 5.1*:

$$\boxed{-\text{rot } \mathbf{E} = \mu \cdot (\mathbf{H}/\tau_2 + \delta \mathbf{H}/\delta t)} \qquad (5.4^*)$$

If we again apply the curl to equation 5.4*

$$-\text{rot rot } \mathbf{E} = \mu \cdot (1/\tau_2) \cdot \text{rot } \mathbf{H} + \mu \cdot \delta(\text{rot } \mathbf{H})/\delta t \qquad (5.5)$$

and insert equation 5.1*, we obtain:

$$-\text{rot rot } \mathbf{E} = \mu \cdot \varepsilon \cdot (\mathbf{E}/\tau_1\tau_2 + (1/\tau_2) \cdot \delta \mathbf{E}/\delta t + (1/\tau_1) \cdot \delta \mathbf{E}/\delta t + \delta^2 \mathbf{E}/\delta t^2) \qquad (5.5^*)$$

which according to the rules of vector analysis can still be further simplified: = rot rot E = ΔE - grad div E , where we should remember that the divergence has to vanish (div E = O. fig. 3.2, equation 3.7), should the corresponding field vortex be inserted!

Furthermore the following well-known abbreviation can be inserted: $\mu \cdot \varepsilon = 1/c^2$ (5.6)

With that the relation with the speed of light c simplifies to the sought-for field equation:

$$\underbrace{\Delta \mathbf{E} \cdot c^2}_{a} = \underbrace{\delta^2 \mathbf{E}/\delta t^2}_{b} + \underbrace{(1/\tau_1) \cdot \delta \mathbf{E}/\delta t}_{c} + \underbrace{(1/\tau_2) \cdot \delta \mathbf{E}/\delta t}_{d} + \underbrace{\mathbf{E}/\tau_1\tau_2}_{e} \qquad (5.7)$$

This equation describes the spatial (a) and temporal (b, c, d) distribution of a field vector. It describes the electromagnetic wave (a, b) with the influences that act damping. As dumping terms the well-known eddy current (c) and in addition the newly introduced potential vortex (d) appear.

Field vector: ψ = E, H, j, B or D

1. elliptic potential equation:
(stationary: $t \longrightarrow \infty$ resp. $\delta/\delta t = 0$)

$$\underbrace{\Delta\psi \cdot c^2}_{a} = \underbrace{\psi/\tau_1\tau_2}_{e} \tag{5.8}$$

2. hyperbolic equation:
(undamped wave equation)

$$\underbrace{\Delta\psi \cdot c^2}_{a} = \underbrace{\delta^2\psi/\delta t^2}_{b} \tag{5.9}$$

3. parabolic equation:
(vortex equation)

$$\underbrace{\Delta\psi \cdot c^2}_{a} = \underbrace{(1/\tau) \cdot \delta\psi/\delta t}_{c/d} \tag{5.10}$$

decay time of the eddy currents = relaxation time: $\tau_1 = \varepsilon/\sigma$ (5.3)

decay time of the potential vortices = relaxation time: $\tau_2 \sim \mu \cdot \sigma$ (5.11)

Fig. 5.2: mathematically divisible individual cases.

5.2 Mathematical interpretation of the fundamental field equation

Every specialist will be surprised to find the Poisson equation (a, e) again as a term in the wave equation. This circumstance forces a completely new interpretation of stationary fields upon us. The new damping term, that is formed by the potential vortices (d), is standing in between.

Let us start with a mathematical analysis. We have applied the curl to equation 5.4*, then inserted equation 5.1* and obtained a determining equation for the electric field strength E. Of course we could as well have applied the curl to equation 5.1* and inserted equation 5.4*. This would have resulted in the determining equation for the magnetic field strength H.

If we insert Ohm's law (5.2) and cancel down the specific conductivity, or we put in the relations of material (3.5) or (3.6) and cancel down by u respectively ε, then the field equation can likewise be written down for the current density j, for the induction B or for the dielectric displacement D.

It just is phenomenal that at all events equation 5.7 doesn't change its form at all. The field vector is thus arbitrarily interchangeable! This circumstance is the foundation for the claim of this field equation to be called fundamental.

It does make sense to introduce a neutral descriptive vector ψ as a substitute for the possible field factors E, H, j, B or D.

The fundamental field equation 5.7 consists of three different types of partial differential equations: a hyperbolic (b), a parabolic (c and d) and an elliptic (e) type. On the left-hand side each time the Laplace operator (a) is found which describes the spatial distribution of the field factor.

The potential equation of the elliptic type (e) is known as Poisson equation. It describes the stationary borderline case of a worn off temporal process ($t \rightarrow \infty$, resp. $\delta/\delta t = O$).

With this equation potentials and voltages can be calculated exactly like stationary electric currents (5.8).

The hyperbolic equation (b). known as wave equation, shows a second derivative to time. which expresses an invariance with regard to time reversal; or stated otherwise: the direction of the time axis can be reversed by a change of sign of t, without this having an influence on the course of frequency. Wave processes hence are reversible. Equation 5.7 makes clear that a wave without damping by no means can exist in nature. For that both time constants (τ_1 and τ_2) would have to have an infinite value, which is not realizable in practice. Seen purely theoretical, undamped waves could withdraw themselves from our measuring technique (5.9).

Both vortex equations of the parabolic type (c and d) only show a first derivative to time. With that they are no longer invariant with regard to time reversal. The processes of the formation and the decay of vortices, the so-called diffusion, are as a consequence irreversible. Seen this way it is understandable that the process of falling apart of the vortex, where the vortex releases its stored energy as heat e.g. in form of eddy losses, can not take place in reverse. This irreversible process of diffusion in the strict thermodynamic sense increases the entropy of the system (5.10).

Because it poses an useful simplification for mathematical calculations, often the different types of equations are treated isolated from each other. But the physical reality looks different.

field vector: ψ = E, H, j, B or D

1. Borderline case: no conductivity (vacuum)
($\sigma = 0$; $1/\tau_1 = \sigma/\varepsilon = 0$):

$$\underbrace{\Delta\psi \cdot c^2}_{a} = \underbrace{\delta^2\psi/\delta t^2}_{b} + \underbrace{(1/\tau_2)\cdot \delta\psi/\delta t}_{d}$$

(5.12)

(damping by potential vortices)

2. Borderline case: ideal conductivity (superconductor)
($1/\sigma = 0$; $1/\tau_2 = 0$):

$$\underbrace{\Delta\psi \cdot c^2}_{a} = \underbrace{\delta^2\psi/\delta t^2}_{b} + \underbrace{(1/\tau_1)\cdot \delta\psi/\delta t}_{c}$$

(5.12*)

(damping by eddy currents)

3. Diffusion equation

$$\underbrace{\Delta\psi \cdot c^2}_{a} = \underbrace{(1/\tau)\cdot \delta\psi/\delta t}_{c/d} + \underbrace{\psi/\tau_1\tau_2}_{e}$$

(5.12**)

(vortex)

Fig. 5.3: Two borderline cases of the damping of waves and
the diffusion equation for the decay of vortices

5.3 Physical interpretation of the fundamental field equation

In nature the different types of equations always occur in a combined manner.

1. Let's take the concrete case of the particle-free vacuum. Here the specific conductivity is zero. The relaxation time constant $\tau_1 = \varepsilon/\sigma$ responsible for the decay of vortices tends towards infinity according to equation 5.3 and the terms (c) and (e) are cancelled from the field equation 5.7. What remains is the by potential vortices (d) damped wave equation (b) (equation 5.12).

2. The reversed case (with $\tau_2 \longrightarrow \infty$) will consequently occur in materials without resistance, super conducting materials. We now are dealing with the well-known case of the wave damped by eddy currents (equation 5.12*).

Virtually all in nature existing materials however don't fulfil these boundary conditions, from which it follows that both damping terms always occur together and in addition the stationary term (e) becomes active.
It is true that every antenna demonstrates that the electromagnetic wave is convertible in high-frequency alternating currents and voltages, which then are amplified in the receiver. But until this fundamental equation was written down it however was not understood that this transition takes place by means of a vortex. Used are either antennas from well conducting material, or wave guides and horn radiators, which only have a minimal conductivity, because they are filled with air. Actually the wave can be converted in two dual ways; by means of the rolling up to current eddies or to potential vortices (fig. 1.4). Now we finally are capable to explain, why wave guides make possible a better degree of effectiveness: Owing to the concentration effect of the potential vortex the HF-power is bound in the inside and not emitted until the antenna is reached as happens for a wire for reason of the skin effect.
Therefore, physically, one has to imagine this relation, which describes the transition of an electromagnetic wave into a vortex, in the way that the wave spontaneously can roll up to a vortex in case it is disturbed from the outside. The more vortices are generated, the larger consequently is the damping of the wave (equations 5.12 and 5.12*).

3. The life span of the vortices is limited and is determined by the electric conductivity. The at first stored vortices decay with their respective time constant τ. This process is described by the diffusion equation 5.12**. The final stage of the decaying vortices finally is described by the Poisson equation (a, e: equation 5.8).

If the vortex falls apart, it converts the in the vortex stored energy in heat. These processes are known from the eddy current. We speak of heating losses, that the stationary currents cause in the conductor material.
But new is the concept that such vortex phenomena can occur as dielectric losses in capacitors or in the air. The microwave oven or induction welding are good examples of this.

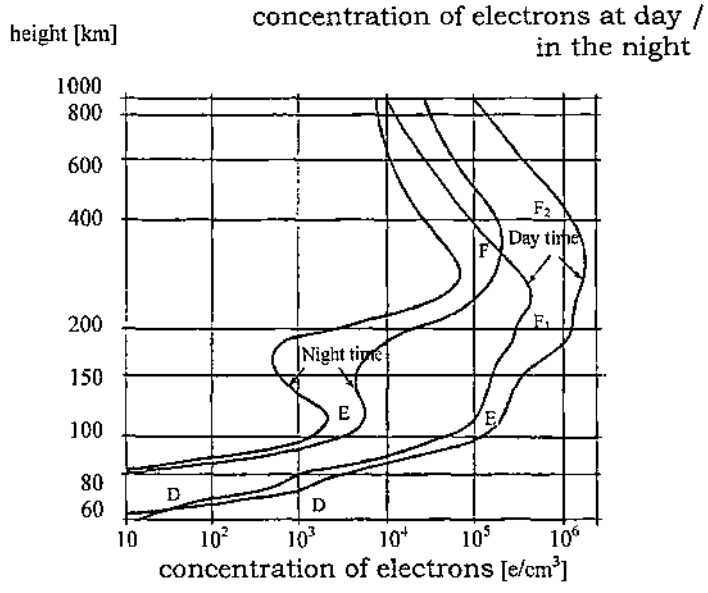


Fig. 5.4: The dependency on height of the ionisation in the ionosphere for medium latitudes .<i>

left curve: for a minimum of sun spots

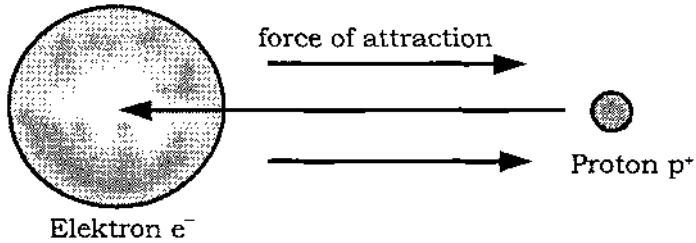
right curve: for a maximum of sun spots

<i>: H.L. Konig: Unsichtbare Umwelt (Wetterfuhligkeit), 5. Aufl., Bild 6, Seite 11, Verlag Moos & Partner Milnchen, ISBN 3-89164-058-7

5.4 Phenomenological interpretation of the fundamental field equation

How does a damping by vortices take effect in practice? First of all we notice that the reception of broadcastings gets worse. "The information signal is neglectable regarding the noise" explains the radio engineer and means, the number of vortices increases at the expense of the wave intensity.
Why, does the pupil ask, is it so cold in space? There the sun shines day and night and in addition much more intensely than on earth! The correct answer would have to read that because of the extremely small conductivity no diffusion process can take place. We owe the warmth on our earth solely the here taking place decay of vortices. Responsible is the conductivity of the atmosphere.
In 60 km to 500 km height over the earth's surface, the region which is called the ionosphere, the gases predominantly exist in ionized form. There a very good conductivity prevails and eddy current losses are the result. Correspondingly high are the measurable temperatures. Besides the diffusion process the eddy currents carry out a damping of the cosmic radiation. We say the sunlight is filtered and reduced to a for nature bearable intensity.
But not all frequencies are damped in the same way (fig. 2.8). We observe a blue shift, if we look into the actually black sky. The blue sky doesn't show any spots or clouds. The reason is to be sought in the skin effect of the eddy currents, which strive outwards. Since no edge of a conductor is present here, no skin can form. The vortices spread evenly over the ionosphere.
The potential vortex however is able to structure. It merely needs a bad conductivity and this it finds in lower heights between 1 km and 10 km. It damps the wave and with that also the light, for which reason we say it becomes darker, the sun disappears behind clouds.

The clouds well visibly form the discussed vortex balls and vortex strings. Clouds can form virtually from the nowhere during intense solar irradiation, i.e. the waves can roll up to vortices. But as a rule this takes place above the oceans. Here also the phenomenon of transport has an effect. Because of the high dielectricity the water surface favours the formation of potential vortices. So the vortices bind individual water molecules and carry them away. If a diffusion process takes place, in which the vortex decays, then it rains. This can happen in two different ways:
1. Either the conductivity increases. If for instance during intense solar irradiation air ions form, the sun is able to break up clouds and fog. Or when the air is raised in higher layers with better conductivity, because a mountain forces this, then it rains at the mountain edge.
2. For potcntial vortices the electric field is standing perpendicular to them. If at one point an exceptionally lot of vortices join together, which let the cloud appear particularly dark to black, then the danger exists that the ionization field strength for air is reached, in which case a conductive air channel forms along which the stored up charges discharge. Also lightning is a diffusion process, in which potential vortices decay and rain can form.
In connection with the electromagnetic environmental compatibility great importance is attributed in particular to the storage and the decay of electric vortices. There not only is an academic-scientific interest in the question, how many potential vortices are generated, how many are stored and how many decay, if we make a telephone call with a handy, if we are staying under a high-tension line or if we are eating food, which has been heated up in a microwave oven. The necessary mathematical description is provided by the fundamental field equation 5.7.



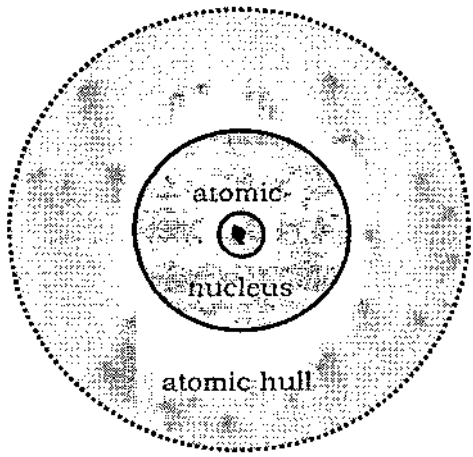


Fig. 5.5: The structure of atoms in the view of the fundamental field equation

condition for equilibrium: $\tau_1 = \tau_2$ (5.13)

5.5 Atomistic interpretation of the fundamental field equation

Let's again turn to the smaller, the atomistic dimensions. Here positively charged protons and negatively charged electrons are found. Both are matter particles and that means that seen from the outside both have the identical swirl direction. For reason of the unequal charge conditions they attract each other mutually and according to fig. 4.9 rotate around a common centre of mass as differently heavy pair. Chemists say: "the light electron orbits the heavy atomic nucleus". With small balls they try to explain the atomic structure.
But the model is no good: it contradicts causality in the most elementary manner. We are dealing with the problem that according to the laws of electrodynamics a centripetally accelerated electron should emit electromagnetic waves and continuously lose energy, to eventually plunge into the nucleus.
Our experience teaches that this fortunately is not true - and Niels Bohr in order to save his model of the atom was forced to annul the laws of physics with a postulate founded in arbitrariness.
Actually this state only exists for a very short time and then something unbelievable happens: the electron can't be distinguished as an individual particle anymore. "It is smeared over the electron orbit" do certain people say; "it possesses a dual nature" says Heisenberg. Besides the corpuscular nature the electron should in case of its "second nature" form a matter wave, "the position of the electron is to be looked at as a resonance which is the maximum of a probability density", do explain us de Broglie and Schrodinger.

These explanations can hardly convince. If the electron loses its particle nature in its second nature, then it also will lose its typical properties, like for instance its mass and its charge. but this is not the case.
THE vortex theory provides clear and causal answers: if the electron were a ball it continuosly would lose energy, therefore another configuration forms that does not know this problem. Here the phenomenon of transport takes an effect. The electron opens its vortex centre and takes the tiny protons and neutrons as atomic nucleus up into itself. The Bohr electron orbit with that is not a path anymore, but is occupied by the whole particle as spherical shell. This is confirmed by the not understood measurements exactly like the photos of individual atoms with the scanning electron microscope.
But now an electron does in its inside have the opposite swirl direction as the proton seen from the outside. As a consequence a force of repulsion will occur, which can be interpreted as the to the outside directed current eddy, the force of attraction for reason of the opposite charge works in the opposite direction and can be interpreted as the potential vortex effect.
If both vortices are equally powerful: $\tau_1 = \tau_2$ (5.13)
or if both forces are balanced, as one usually would say, then the object which we call an atom is in a stable state.
It probably will be a result of the incompatible swirl direction, why a very big distance results, if the electron becomes an enveloping electron. On such a shell not too many electrons have room. Because of the rotation of their own, the electron spin, they form a magnetic dipole moment, which leads to a magnetic attraction of two electrons if they put their spin axis antiparallelly.
As a "frictionless" against one another rotating pair they form two half-shells of a sphere and with that occupy the innermost shell in the hull of an atom. If the positive charge of the nucleus is still not balanced with that, then other electrons is left only the possibility to form another shell. Now this next electron takes the whole object up into itself. The new shell lies further on the outside and naturally offers room to more as only two vortices.

approach:

$$\mathbf{E}(\mathbf{r},t) = \psi(\mathbf{r},t) \cdot e^{-\omega t} \tag{5.17}$$

with

$$\omega = 1/\tau = (1/\tau_1 + 1/\tau_2)/2 \tag{5.18}$$

we insert the approach 5.17 and its derivations:

$$\delta\mathbf{E}/\delta t = -\omega \cdot \psi \cdot e^{-\omega t} + (\delta\psi/\delta t) \cdot e^{-\omega t} \tag{5.17*}$$

$$\delta^2\mathbf{E}/\delta t^2 = \omega^2 \cdot \psi \cdot e^{-\omega t} - 2\omega \cdot (\delta\psi/\delta t) \cdot e^{-\omega t} + (\delta^2\psi/\delta t^2) \cdot e^{-\omega t} \tag{5.17**}$$

into the fundamental field equation 5.7:

$$\Delta\mathbf{E} \cdot c^2 = \delta^2\mathbf{E}/\delta t^2 + (1/\tau_1) \cdot \delta\mathbf{E}/\delta t + (1/\tau_2) \cdot \delta\mathbf{E}/\delta t + \mathbf{E}/\tau_1\tau_2$$

and divide by $e^{-\omega t}$:

(5.19)

$$\begin{aligned} \Delta\psi \cdot c^2 = {} & \psi/\tau_1\tau_2 && \text{(a) = (e)} \\ & - \omega \cdot \psi \cdot (1/\tau_1 + 1/\tau_2) && \text{(c, d)} \\ & + (1/\tau_1 + 1/\tau_2) \cdot \delta\psi/\delta t && \text{(c, d)} \\ & + \omega^2 \cdot \psi - 2\omega\delta\psi/\delta t + \delta^2\psi/\delta t^2 && \text{(b)} \end{aligned}$$

insert the frequency according to equation 5.18:

(5.19*)

$$\begin{aligned} \Delta\psi \cdot c^2 = {} & \psi/\tau_1\tau_2 && \text{(a) = (e)} \\ & - (\psi/2) \cdot (1/\tau_1 + 1/\tau_2)^2 && \text{(c, d)} \\ & + (1/\tau_1 + 1/\tau_2) \cdot \delta\psi/\delta t && \text{(c, d)} \\ & + (\psi/4) \cdot (1/\tau_1 + 1/\tau_2)^2 && \text{(b)} \\ & - (1/\tau_1 + 1/\tau_2) \cdot \delta\psi/\delta t + \delta^2\psi/\delta t^2 && \text{(b)} \end{aligned}$$

summarized with equation 5.18:

$$\Delta\psi \cdot c^2 = \psi/\tau_1\tau_2 - \omega^2 \cdot \psi + \delta^2\psi/\delta t^2 \tag{5.20}$$

Fig. 5.6: Derivation of the Klein-Gordon equation (5.20) from the fundamental field equation (5.7)

5.6 Derivation of the Klein-Gordon equation

The valid model of the atom today still raises problems of causality, as has been explained. An improvement was provided by an equation, which was proposed by the mathematician Schrodinger 1926 as a model description. This equation in this way missed the physical root, but it nevertheless got international acknowledgment, because it could be confirmed experimentally. Looking backwards from the result then the physical interpretation of the probability density of the resonance of the waves could be pushed afterwards.

$$i \cdot \hbar \cdot \delta\psi/\delta t = U \cdot \psi - (\hbar^2/2m) \cdot \Delta\psi \quad (5.14)$$

The Schrodinger equation is valid for matter fields (of mass m), while the interaction with a outside force field the energy U indicates. It can be won from a wave equation by conversion, which possibly is the reason why it usually is called a wave equation, although in reality it is a diffusion equation, so a vortex equation!
For the derivation Schrodinger gives the approach of a harmonic oscillation for the complex wave function ψ:

$$\psi(r,t) = \phi(r) \cdot e^{-i\omega t} \quad (5.15)$$

if the entire time dependency can be described by one frequency f = W/h (de-Broglie relation):

$$\omega = 2\pi f = W \cdot 2\pi/h = W/\hbar \quad (5.16)$$

The high-put goal is: if the structure of the atom is determined by the fundamental field equation 5.7 then one should be able to derive the experimentally secured Schrodinger equation and to mathematically describe the discussed special case. Also we select at first an approach periodic in time:

$$E(r,t) = \psi(r,t) \cdot e^{-\omega t} \quad (5.17)$$

with

$$\omega = 1/\tau = (1/\tau_1 + 1/\tau_2)/2 \; . \quad (5.18)$$

We insert the approach 5.17 and its derivations into the field equation 5.7 and divide by the damping term e^{-wt}:

$$\Delta\psi \cdot c^2 = \psi/\tau_1\tau_2 - \omega \cdot \psi \cdot (1/\tau_1 + 1/\tau_2) + (1/\tau_1 + 1/\tau_2) \cdot (\delta\psi/\delta t) + \\ + \omega^2 \cdot \psi - 2\omega\,\delta\psi/\delta t + \delta^2\psi/\delta t^2 \quad (5.19)$$

If as the next step the angular frequency according to equation 5.18 is inserted, then summarized the provisional intermediate result results:

$$\Delta\psi \cdot c^2 = \psi/\tau_1\tau_2 - \omega^2 \cdot \psi + \delta^2\psi/\delta t^2 \quad (5.20)$$

The derived equation 5.20 represents formally seen the Klein-Gordon equation, which is used for the description of matter waves in quantum mechanics and which particularly in the quantum field theory (e.g. mesons) plays an important role. Even if it often is regarded as the relativistic invariant generalization of the Schrodinger equation, it at a closer look is incompatible with this equation and as "genuine" wave equation it is not capable of treating vortex problems correctly, like e.g. the with the Schrodinger equation calculable quantization of our microcosm.

Schrödinger approach $\psi(\mathbf{r},t) = \phi(\mathbf{r}) \cdot e^{-i\omega t}$ (5.15)

with: f = W/h; de-Broglie relation:

$$\omega = 2\pi f = W \cdot 2\pi/h = W/\hbar \quad (5.16)$$

the derivation:

$$\delta\psi/\delta t = -i\,\omega \cdot \psi$$

rewritten for ψ:

$$\psi = (i/\omega) \cdot \delta\psi/\delta t \quad (5.21)$$

2. derivation:

$$\delta^2\psi/\delta t^2 = -i\,\omega \cdot \delta\psi/\delta t \quad (5.22)$$

inserted in equation 5.20:

$$\Delta\psi \cdot c^2 = \psi/\tau_1\tau_2 - 2\,i\,\omega \cdot \delta\psi/\delta t \quad (5.23)$$

= sought-for Schrödinger equation (usual notation):

$$i \cdot \hbar \cdot \delta\psi/\delta t = U \cdot \psi - (\hbar^2/2m) \cdot \Delta\psi \quad (5.14)$$

comparison of coefficients is needed:
Einstein relation (with the speed of light c):
with (5.16): $W = m \cdot c^2 = \omega \cdot \hbar$ (5.24)
coefficient of the
imaginary part: $-2\,i\,\omega = 2(\omega/i) = 2mc^2/i\hbar$ (5.25)
comparison of coefficients
for the
real part: $1/\tau_1\tau_2 c^2 = U \cdot 2m/\hbar^2$ (5.26)

kinetic energy of a particle moving with the speed v:

$$\tfrac{1}{2} \cdot m \cdot v^2 = W - U \quad (5.27)$$

v = group velocity of the matter wave:

$$v = hf/mc = \hbar\omega/mc \quad (5.28)$$

Eq.5.27: $U = W - \tfrac{1}{2} \cdot m \cdot (\hbar\omega/mc)^2$ (5.27*)

Eq.5.24: $W = \omega \cdot \hbar$; $(\hbar\omega/mc) = c$; resp.: $m/\hbar = \omega/c^2$

In eq.5.27* the sought-for coefficient reads (according to eq. 5.26):

$$U \cdot 2m/\hbar^2 = 2\omega/c^2\hbar \cdot [\omega \cdot \hbar - \tfrac{1}{2} \cdot m \cdot c^2]$$
$$= 2\omega/c^2\hbar \cdot [\omega \cdot \hbar - \tfrac{1}{2} \cdot \omega \cdot \hbar] = \underline{\underline{(\omega/c)^2}} \quad (5.29)$$

Fig. 5.7: Derivation of the time dependent Schrodinger equation

5.7 Derivation of the time dependent Schrodinger equation

With the Schrodinger approach 5.15 and its derivations the derivation is continued:

$$\psi(r,t) = \phi(r) \cdot e^{-i\omega t} \quad , \qquad (5.15)$$

$$\delta\psi/\delta t = -i\omega \cdot \psi \, , \quad \text{bzw.} \quad \psi = (i/\omega) \cdot \delta\psi/\delta t \qquad (5.21)$$

$$\delta^2\psi/\delta t^2 = -i\omega \cdot \delta\psi/\delta t \qquad (5.22)$$

The for a harmonic oscillation won relations according to equation 5.21 and 5.22 are now inserted into equation 5.20:

$$\Delta\psi \cdot c^2 = \psi/\tau_1\tau_2 - 2i\omega \cdot \delta\psi/\delta t$$

This is already the sought-for Schrodinger equation, as we will see in a moment, when we have analysed the coefficients. Because, besides equation 5.16 for the total energy W, also the Einstein relation is valid (with the speed of light c):

$W = m \cdot c^2 = \omega \cdot \hbar$, (5.24)

we can replace the coefficients of the imaginary part by:

$2(\omega/i) = 2mc^2/i\hbar$ (5.25)

To achieve that equation 5.23, as required, follows from the Schrodinger equation 5.14, a comparison of coefficients is carried out for the real part:

$$1/\tau_1\tau_2 c^2 \overset{!}{=} U \cdot 2m/\hbar^2 \quad (5.26)$$

If thc kinetic energy of a particle moving with the speed v is:

$\frac{1}{2} \cdot m \cdot v^2 = W - U$, (5.27)

then acccording to De Broglie this particle has the wavelength h/mv. The consideration of the particle as matter wave demands an agreement with the wave length c/f of an electro-magnetic wave (with the phase velocity c). The particle hence has the speed v, which corresponds with the group velocity of the matter wave:

$v = hf/mc = \hbar\omega/mc$, (5.28)

if we insert v into equation 5.27 :

$U = W - \frac{1}{2} \cdot m \cdot (\hbar\omega/mc)^2$ (5.27*)

According to equation 5.24 on the one hand the total energy is $W = w \cdot h$ and on the other hand the relation 5.28 gives $(\hbar\omega/mc) = c$ resp.: $m/\hbar = \omega/c^2$

Inserted into equation 5.27* the sought-for coefficient reads (according to eq. 5.26):

$$U \cdot 2m/\hbar^2 = 2\omega/c^2\hbar \cdot [\omega \cdot \hbar - \tfrac{1}{2} \cdot m \cdot c^2]$$

$$= 2\omega/c^2\hbar \cdot [\omega \cdot \hbar - \tfrac{1}{2} \cdot \omega \cdot \hbar] = \underline{(\omega/c)^2} \qquad (5.29)$$

comparison of coefficients 5.26 is fulfilled if:

$$1/\tau_1\tau_2 c^2 \overset{!}{=} U \cdot 2m/\hbar^2 = (\omega/c)^2 \qquad (5.30)$$

the angular frequency is given by equation 5.18. Therefore has to be valid:

$$1/\tau_1\tau_2 \overset{!}{=} \tfrac{1}{4}\,(1/\tau_1 + 1/\tau_2)^2 \qquad (5.31)$$

resp.:

$$\sqrt{1/\tau_1\tau_2} \overset{!}{=} \tfrac{1}{2}\,(1/\tau_1 + 1/\tau_2) \qquad (5.32)$$

arithmetic average = geometric average, if:

$$1/\tau_1 = 1/\tau_2 \text{ and: } \boxed{\tau_1 = \tau_2} \qquad (5.13)$$

is valid. Eq. 5.23 is divided by c^2 and
eqs. 5.30 and 5.25 are inserted:

$$\boxed{\Delta\psi = U \cdot \psi \cdot (2m/\hbar^2) + (2m/i\hbar) \cdot \delta\psi/\delta t} \qquad (5.14^*)$$

= *time dependent Schrödinger equation* 5.14.

replace $\delta\psi/\delta t$ acc. to eq. 5.21 with $\omega = W/\hbar$ acc.to eq. 5.24:

$$\Delta\psi = U \cdot \psi \cdot (2m/\hbar^2) + (2m/i\hbar) \cdot \psi \cdot (-i) \cdot W/\hbar \qquad (5.33)$$

Schrödinger approach 5.15 for the function of position $\phi(r)$:

$$\Delta\phi = (U\,2m/\hbar^2 - W \cdot 2m/\hbar^2) \cdot \phi \qquad (5.34)$$

$$\boxed{\Delta\phi = -2m/\hbar^2\,(W - U) \cdot \phi} \qquad (5.35)$$

= *time independent Schrödinger equation.*

Fig. 5.8: Derivation of the time independent Schrodinger equation

5.8 Derivation of the time independent Schrodinger equation

The goal is reached if we are capable to fulfil the comparison of coefficients 5.26:

$$U \cdot 2m/\hbar^2 = (\omega/c)^2 = 1/\tau_1\tau_2 c^2 \qquad (5.30)$$

The angular frequency w is given by equation 5.18. Therefore has to be valid:

$$¼\,(1/\tau_1 + 1/\tau_2)^2 = 1/\tau_1\tau_2 \quad (5.31)$$

$$½ \cdot (1/\tau_1 + 1/\tau_1) = \sqrt{1/\tau_1\tau_2} \quad (5.32)$$

As is well-known the arithmetic and the geometric average only correspond in case the variables are identical. In this case, as already required in equation 5.13:

$$\tau_1 = \tau_2 . \quad (5.13)$$

has to hold.
From this we can draw the conclusion that the Schrodinger equation is just applicable to the described special case (according to eq. 5.13), in which the eddy current, which tries to increase the particle or its circular path and the potential vortex, which keeps the atoms together and also is responsible for the stability of the elementary particles, are of identical order of magnitude.

As a check equation 5.23 is divided by c^2 and equations 5.30 and 5.25 are inserted:

$$\Delta\psi = U \cdot \psi \cdot (2m/\hbar^2) + (2m/i\hbar) \cdot \delta\psi/\delta t \quad (5.14^*)$$

This is the time dependent Schrodinger equation 5.14 resolved for $\Delta\psi$.

Next we replace $\delta\psi/\delta t$ according to equation 5.21 with $\omega = W/\hbar$ acc. to equation 5.24:

$$\Delta\psi = U \cdot \psi \cdot (2m/\hbar^2) + (2m/i\hbar) \cdot \psi \cdot (-i) \cdot W/\hbar \quad (5.33)$$

If we separate the space variables $\phi(r)$ from time by the Schrodinger approach 5.15 we obtain:

$$\Delta\phi = (U\,2m/\hbar^2 - W \cdot 2m/\hbar^2) \cdot \phi \quad (5.34)$$

This quation 5.34 for the function of space coordinates $\phi(r)$ is the time independent Schrodinger equation:

$$\Delta\phi = -2m/\hbar^2\,(W - U) \cdot \phi \quad (5.35)$$

The solutions of this equation which fulfil all the conditions that can be asked of them (of finiteness, steadiness, uniqueness etc.), are called eigenfunctions. The existence of corresponding discrete values of the energy W, also called eigenvalues of the Schrodinger equation, are the mathematical reason for the different quantum postulates.

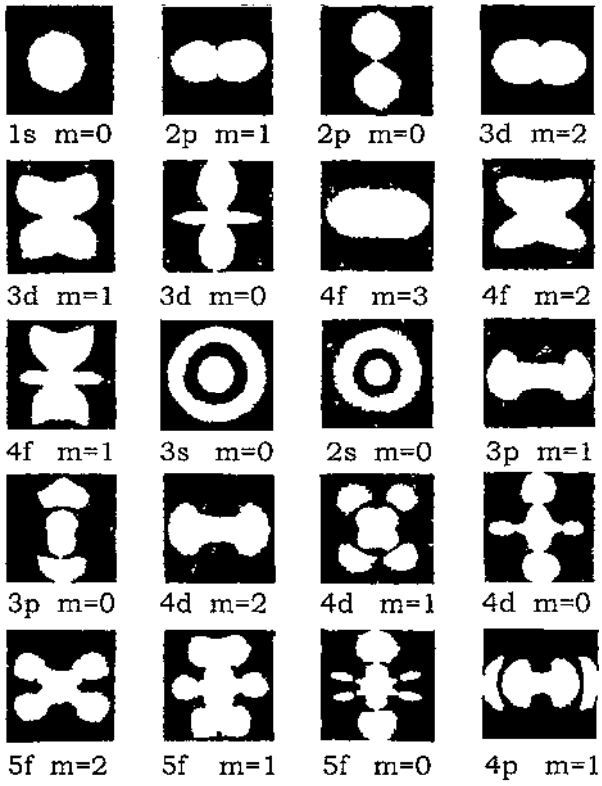


Fig. 5.9: Photographs of models of the probability densities for
different states of the hydrogen atom.
The densities are symmetrical if rotated around the vertical axis<i>

taken from:
<i>: U. Gradmann/H. Wolter: Grundlagen der Atomphysik, AVG, Frankfurt a. M. 1971, P. 190.

5.9 Interpretation of the Schrodinger equation

The interpretation of the Schrodinger equation is still disputed among physicists, because the concept of wave packets contradicts the corpuscular nature of the elementary particles. Further the difficulty is added that wave packets at a closer look never are connected, run apart more or less fast, and really nothing can hinder them doing that. But for a particle the connection represents a physical fact. Then there can be no talk of causality anymore. The monocausal division into two different levels of reality, in a space-timely localization and in an energetic description, does not represent a solution but rather the opposite, the abolition of the so-called dual nature. As has been shown, the potential vortex is able to achieve this with the help of its concentration effect.
But from the introduction of this new field phenomenon arises the necessity to interpret the causes for the calculable and with measuring techniques testable solutions of the Schrodinger equation in a new way. Laws of nature do not know a possibility to choose! If they have been accepted as correct, they necessarily have to be applied.

Three hundred years ago the scholars had an argument, whether a division of physical pheomena, like Newton had proposed it, would be allowed to afterwards investigate them in the laboratory individually and isolated from other influences or if one better should proceed in an integrated manner, like for instance Descartes with his cartesian vortex theory. He imagined the celestial bodies floating in ethereal vortices. One absolutely was aware that the whole had to be more than the sum of every single realizaton, but the since Demokrit discussed vortex idea had to make room for the overwhelming successes of the method of Newton. And this idea after 2100 years was stamped, to in the meantime almost have fallen into oblivion.
Today, where this recipe for success in many areas already hits the limits of the physical possibilities, we should remember the teachings of the ancients and take up again the vortex idea It of course is true that only details are calculable mathematically and that nature, the big whole, stays incalculable, wherein problems can be seen.
If we consider the fundamental field equation 5.7, we find confirmed that actually no mathematician is capable to give a generally valid solution for this four-dimensional partial differential equation. Only restrictive special cases for a harmonic excitation or for certain spatial boundary conditions are calculable. The derived Schrodinger equation is such a case and for us particularly interesting, because it is an eigenvalue equation. The eigenvalues describe in a mathematical manner the with measuring techniques testable structures of the potential vortex .
Other eigenvalue equations are also derivable, like the Klein-Gordon equation or the Lionville equation, which is applied successfully in chaos theories. So our view opens, if chaotic systems like turbulences can be calculated as special cases of the same field equation and should be derivable from this equation.
The in pictures recorded and published structures, which at night should have come into being in corn fields, often look like the eigenvalues of a corresponding equation. The ripe ears thereby lie in clean vortex structures flat on the soil. Possibly potential vortices have charged the ears to such high field strength values that they have been pulled to the soil by the Coulomb forces.

Consequences resulting from the derivation of the Schrodinger equation from the fundamental field equation 5.7:

1. *Any experiment which confirms the Schrödinger equation is with that able to confirm at the same time the existence of the newly discovered potential vortex and the correctness of the field-theoretical approach.*

2. *Properties of the atomic hull and of the atomic nucleus, which can be described with the Schrödinger equation, can as of now be interpreted as an electromagnetic phenomenon.*

3. *There exist no particles or wave packets from matter waves, but only configurations consisting of potential vortices and current eddies.*

4. *There exists no matter! What we call matter is nothing but an electromagnetic state of oscillation of empty space.*

The relation between the energy of oscillation and the mass is described by the relation named after Albert Einstein

$$E = mc^2 \quad . \qquad (6.1 = 5.24)$$

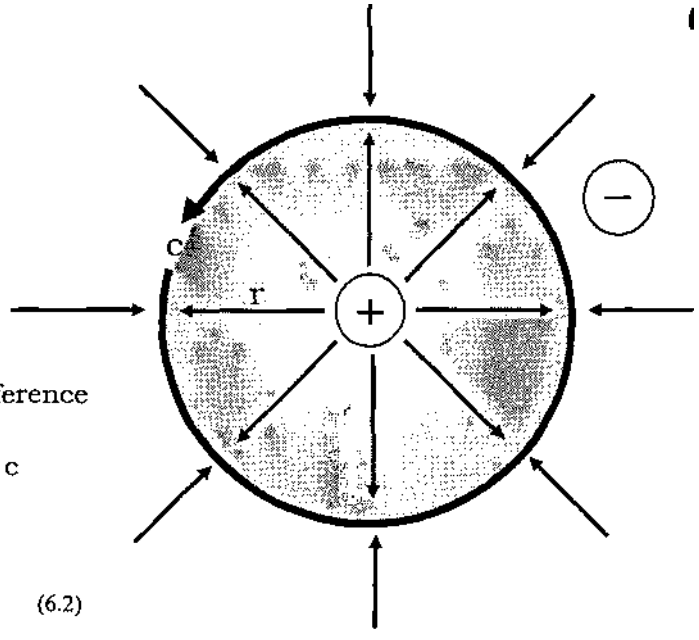
Fig. 6.1: Derivation of the Schrodinger equation, power of proof and consequences

6. Theory of objectivity

6.1 Proof

A new theory only has chances on acknowledgment if it is provable. For that physical phenomena in the sense of the new theory are calculated and independently of this experiments are being carried out. If the calculations are confirmed by reproducible measurement results, then with that the correctness of the approach is proven.
In the here presented case we have chosen the field-theoretical approach instead of the usual quantum physical approach. As a consequence of this we had found as a new phenomenon the vortex of the electric field. With regard to the normally used Maxwell theory this resulted in changed field equations in a dual formulation. If both equations, each of which describes a source-free vortex field, are inserted into each other the result is an only in time and space formulated, generally valid and hence fundamental field equation (5.7, fig. 5.1).
This equation has many special cases; one of them, the Schrodinger equation, could be derived by using an approach which was harmonic in time. We renounced to give special solutions of the Schrodinger equation, because these are printed in numerous text books. On the other hand experiments are known, which are capable to confirm the theoretical solutions and thus to prove the Schrodinger equation. The eigenvalues of the equation describe for instance the shell-shaped structure of the atoms with the by Niels Bohr given radii.
Now this already proven equation was derived from the new field-theoretical approach. Thus for the special case, the area where the Schrodinger equation is valid, the new theory can be said to be proven (fig. 6.1).
We still are not content with that and put another stone on top: we will calculate the quantum properties of the elementary particles for ourselves. These until now have only been measured. Today is merely sought for symmetries and for models of explanation, like e.g. the quark-hypothesis. From a calculation science is miles and miles away. We will compare the calculation results with the measurement values. Then everyone can check and compare for him or herself.
The conditions in an elementary particle are completely different. Here it concerns the vortex itself, whereas the model of the atom merely describes vortex properties, so-called actions at a distance. The differences in size and distances for an atom lie more than five powers of ten over those of a particle!
Here a new problem of causality comes to light, at which we now must have a critical look: the question of the by Einstein postulated constancy and universality of the speed of light. Seen from a relativistic and subjective point of view of an observer, Einstein by all means may be right. But may such a theory be generalized? How are the measurements concerning the speed of light and the relativity of space and time to be judged when looking at them objectively?
The current measurements of speeds faster than light speak a clear language and represent a challenge (fig. 3.1, violation of the principle of causality no. 5).

The electron as a spherical capacitor (see fig. 4.3):



with circumference

$U = 2\pi r \sim c$

is valid:

$$r \sim c \qquad (6.2)$$

field theoretical approach (vortex particles):
The amount of energy bound in the inside of the particle is identical with the free and measurable amount of energy on the outside of the particle.

(If the number of particles is left unchanged): _____
In an isolated system the sum of the energy is constant _____

(particle = electromagnetic vortex) _____
Energy is a state description of electromagnetism.

Fig. 6.2: Derivation of the law of conservation of energy

6.2 Law of conservation of energy

Let the starting-point for our considerations be the electromagnetic wave in a particle-free vacuum. Here no vortices appear, so that the plane wave can propagate undamped with the speed of light, and in this way a transport of energy takes place. Electric and magnetic energy each are the same magnitude.
Let's now imagine the symmetry is disturbed as the wave is "slowed down" on one side. As a possible result the wave rolls up to a spherical vortex.
As we will see such a process is possible, for instance at impact on a strong field. Thus part of the energy is bound in the inside. This part from now on withdraws itself from every possibility to measure it. We can only measure the second part of the field energy, with which the particle interacts with its neighbourhood.
We can assume that:

The amount of energy bound in the inside of the particle is identical with the free and measurable amount of energy on the outside of the particle.

The same energy W_e = 0,51 MeV, we attribute to the electron for reason of its mass with the help of the Einstein relation (6.1), is also bound in its inside. This conclusion is also applicable to other elementary particles and with that to all matter.
We here again recognize the principle of the duality between the to the outside striving eddy current in the inside of the elementary vortex and the concentrating potential vortex on the outside. Thus also seen energetically both are of the same magnitude. Whereas in the case of the electromagnetic wave it concerns a symmetrical oscillation around "zero", by the process of quantization, by the rolling up to a spherical vortex, there forms an energetic state of space different from zero. The order of magnitude is determined by the number of elementary vortices, of which the particles and all matter consist.
Anti-matter forms the opposite energetic state and this again is for the particles of matter available in their inside in a bound form.
As long as we do not artificially produce new elementary vortices and thus keep the number of available vortices constant, the energetic state will not change, or as it is formulated in text books:

In an isolated system the sum of the energy is constant.

THE law of conservation of energy is not an axiom, but follows without compulsion from the vortex theory. It is not elementary, but a consistently derivable consequence of the field-theoretical approach, according to which solely the field acts as cause for all other physical phenomena, also for the conservation of energy! Because the cause of it is the electromagnetic field, the following has to hold:

Energy is a state description of electromagnetism.

Now we finally can explain why energy can be converted. Different forms of energy only are different forms of formation of the same phenomenon!
Of course this statement of the field-theoretical approach does not yet explain what, for instance, the temperature has to do with electromagnetism. I ask for some patience; no question will be left unanswered.

From

$$c \sim r \tag{6.2}$$

follows:

The speed of light determines the size of the elementary particles.

Energy of a capacitor:

$$W = Q^2/C, \tag{6.3}$$

written down for the electron (with the Einstein relation):

$$W_e = e^2/C_e = m_e c^2 = 0{,}51 \text{ MeV} \tag{6.1}$$

Capacity of a spherical capacitor:

$$C_e = \varepsilon_0 \cdot 4\pi r_e \tag{6.4}$$

"classical" radius of the electron<i> is:

$$r_e = e^2/\varepsilon_0 \cdot 4\pi \cdot W_e \tag{6.5}$$

$$r_e = 2{,}82 \cdot 10^{-15} \text{ m} \tag{6.6}$$

in the case of Kuchling<ii> the radius of the electron is:

$$r_e = 1{,}41 \cdot 10^{-15} \text{ m} . \tag{6.7}$$

Fig. 6.3: Calculation of the radius of the electron.

<i>: Mende, Simon: Physik, Gl. 10.39, VEB-Leipzig, 4. Aufl.

<ii>: Kuchling: Physik, Gl. At4, VEB-Leipzig, bis einschl. 11. Auflage 1974

6.3 Radius of the electron

For the crucial process, in which the electromagnetic wave rolls up to a vortex, it is for reasons of continuity to be expected that the velocity of propagation remains equal that thus for the vortex oscillation exactly like for the electromagnetic wave the speed of light is determining. The direction of propagation in the case of the vortex takes place perpcndicular to the in fig. 6.2 shown field direction of the electric field strength. Not even in that both field-phenomena differ.
Summarizing: the propagation takes place with the speed of light c along a circular path with the perimeter $U = 2\pi r$. Therefore holds:

$$c \sim r \quad (6.2)$$

According to this equation the radius and with that the size of the electron is determined by the speed of light. Therefore the question of the size of the electron is raised.

The energy interpretation predicts that for the theoretical case of a change of size the energy density in the inside of the particle is influenced that however the quantity of the included energy remains unchanged. We therefore can further proceed from the assumption that the bound amount of energy is independent of the size of the particle!

Consequently for the elementary quantum the energy W_e = 0,51 MeV is assumed, which it has acccording to the Einstein relation $W_e = m_e c^2$. For the electron of mass m_e the with measuring techniques determined value is inserted.
The spherical electrode of a spherical capacitor with the above given energy W_e (according to eq. 6.1) and the capacity C_e (according to equation 6.4, fig. 6.3) represents a very realistic model of the negatively charged particle.
In this manner the classical radius of the electron is calculated to be[<i>]: $r_e = 2{,}82 * 10^{-15}$ m.

But in the case of Kuchling it only is half this size[<ii>], what according to equation 6.2 would mean that in the case of Kuchling the light would be on the way only half this fast [<iii>]. Therefore if one is careful, one prefers to be silent concerning this delicate theme and if one is honest, one admits not to know anything exact.
Not only the electron but also all the other elementary particles are according to the field-theoretical approach formed from concentrated potential vortices. For these equation 6.2 hence has to hold in the same manner, so that more generalized we can conclude:

The speed of light determines the size of the elementary particles.

This statement is incompatible with the assumption of a constant speed of light! Because then all elementary particles would have identical size. As is known, however, are the building parts of the atomic nucleus, the protons and neutrons very much smaller than individual electrons. The constancy of the speed of light is to be questioned. This question is of such an elementary importance that we are not content with these considerations and in addition undertake a mathematical derivation in the sense of the field approach.

<iii>: Difference = Thomas factor

The Maxwell laws, source free (figures 3.2 and 3.3):

$$\text{Div } \mathbf{D} = 0 \quad (3.7) \qquad \text{and} \qquad \text{Div } \mathbf{B} = 0 \quad (3.3)$$

Faraday's law of induction	and	Ampère's law
$\mathbf{E} = \mathbf{E}(\mathbf{r},t)$ with $1/\tau_2 = 0$:		$\mathbf{H} = \mathbf{H}(\mathbf{r},t)$ with $\mathbf{j} = 0$ resp. $1/\tau_1 = 0$
$\boxed{\text{rot } \mathbf{E} = -\delta\mathbf{B}/\delta t}$ (5.4)		$\boxed{\text{rot } \mathbf{H} = \delta\mathbf{D}/\delta t}$ (5.1)
with: $\mathbf{B} = \mu \cdot \mathbf{H}$ (5.5)	and	$\mathbf{D} = \varepsilon \cdot \mathbf{E}$ (3.6)

if we again apply the curl to equation 5.4 and insert equation 5.1 (cf. fig. 5.1, eq. 5.5):

$$-\text{rot rot } \mathbf{E} = \mu \cdot \delta(\text{rot } \mathbf{H})/\delta t = \mu \cdot \varepsilon \cdot \delta^2 \mathbf{E}/\delta t^2 \quad (5.5)$$

thanks to missing divergence: $\text{div } \mathbf{E} = 0$ (3.7*)

(fig. 5.2):

= wave equation: $\boxed{\Delta \mathbf{E} \cdot c^2 = \delta^2 \mathbf{E}/\delta t^2}$ (5.9*)

with the speed of light c: $\mu \cdot \varepsilon = 1/c^2$ (5.6)

Hertz' wave = transverse wave = plane wave with:
direction of propagation: $\boxed{v = dx/dt}$ (6.8)

$\boxed{\mathbf{E} = E_z}$, $\boxed{\mathbf{D} = D_z}$, $\boxed{\mathbf{H} = H_y}$, $\boxed{\mathbf{B} = B_y}$ (6.8*)

curl operation (in y-direction): with equation 5.4:

$$\text{rot } \mathbf{E} = -d\mathbf{E}/dx = -d\mathbf{B}/dt \quad (6.9)$$

with 6.8: $d\mathbf{E} = (dx/dt) \cdot d\mathbf{B} = v \cdot d\mathbf{B}$ (6.9*)

or generally: $\boxed{\mathbf{E} = \mathbf{v} \times \mathbf{B}}$ (6.10)

Fig. 6.4: Derivation of the laws of transformation

<i>: Prof. G. Bosse in his text book in reversed direction derives the Faraday law of induction from the law of transformation 6.10, which he again derives from considerations about the Lorentz force. G. Bosse, Grundlagen der Elektrotechnik II, BI 183, Hochschultaschenbucher-Verlag, Mannheim 1967

6.4 The Maxwell field equations

The laws of transformation of the electromagnetic field shall form the starting-point for the coming up considerations. To exclude any doubts with regard to the interpretation, the equations will be derived from the Maxwell laws under the assumption that no sources or charge carriers are present (fig. 3.2 and 3.3) and as a consequence no current density (j = 0) is to be expected.
This corresponds to the vanishing of the time independent terms, which consequently are responsible for the occurring of force effects like e.g. the Lorentz force. Only at the end of this derivation we can understand the sense of this assumption (with $1/\tau_1 = 0$ and $1/\tau_2 = 0$).
The procedure at first corresponds to that of fig. 5.1. Here the fundamental field equation had been derived from Faraday's law of induction and Ampere's law. With the assumptions made this time the in fig. 5.2 treated undamped wave equation is left (5.9, here 5.9*). Whom the derivation is still present can go in at this point.
In a sufficiently great distance from the source we are dealing with a plane wave, in which the field factors only depend on the direction of propagation x. The Hertz' wave is a transverse wave, in which the field pointers oscillate perpendicular to the direction of propagation and in addition stand perpendicular to each other:

$$v = dx/dt \qquad (6.8), \qquad \mathbf{E} = E_z\,,\ \mathbf{D} = D_z\,,\ \mathbf{H} = H_y\,,\ \mathbf{B} = B_y \qquad (6.8^*)$$

The curl, applied to the electric field pointer, itself points in the y-direction:
rot E = - dE/dx . This for the transverse wave carried out curl operation is now compared with Faraday's law of induction (5.4):

$$\text{rot } E = -dE/dx = -dB/dt \qquad (6.9)$$

The relation won in a mathematical way, with the speed fixed by (6.8), reads:

$$dE = (dx/dt) \bullet dB = v * dB \qquad (6.9^*)$$

The result of this derivation at first only is valid for the introduced simplification, for instance for the case of the transverse electromagnetic wave. Better known is apart from that the generalized formulation, which among others by G. Bosse<i> is called law of transformation.

$$\mathbf{E} = \mathbf{v} \times \mathbf{B} \qquad (6.10)$$

With Ampere's law (5.1) we now should proceed in an analogous manner. The result is:

$$\mathbf{H} = -\mathbf{v} \times \mathbf{D} \qquad (6.10^*)$$

This equation 6.10* is given among others by Simonyi<ii>. Now that we know, under which circumstances these equations of transformation can be derived from the Maxwell equations, the actual work can start.

<ii>: K. Simonyi, Theoretische Elektrotechnik, 7. Auflage VEB Verlag Berlin 1979. pp. 921 - 924; In addition see chapter 27.8 in part 3 of this book.

Laws of transformation:

$$\mathbf{E} = \mathbf{v} \times \mathbf{B} = \mathbf{v} \times \mu \cdot \mathbf{H} \qquad (6.10)$$

$$\mathbf{H} = -\mathbf{v} \times \mathbf{D} = -\mathbf{v} \times \varepsilon \cdot \mathbf{E} \qquad (6.10^*)$$

and

We experience the magnetic field as an electric field and the electric field as a magnetic field simply and solely for reason of the same relative motion!

The component of the direction of motion perpendicular to the area defined by the field pointers:

$$E = v \cdot \mu \cdot H \qquad (6.11)$$

and

$$H = -v \cdot \varepsilon \cdot E \qquad (6.11^*)$$

with the relations of material:

$$B = \mu \cdot H \qquad (3.5)$$

$$D = \varepsilon \cdot E \qquad (3.6)$$

with the speed of light:

$$c = 1/\sqrt{\mu \cdot \varepsilon} \qquad (5.6)$$

additional field:

$$E_z = -v^2 \cdot \mu \cdot \varepsilon \cdot E = -(v^2/c^2) \cdot E \qquad (6.12)$$

resp.

$$H_z = -v^2 \cdot \varepsilon \cdot \mu \cdot H = -(v^2/c^2) \cdot H \qquad (6.12^*)$$

basic field: E resp. H (at v = O)

measurable overall field: (if $v \neq O$)

$$E_o = E + E_z \qquad (6.13)$$

resp.

$$Ho = H + H_z \qquad (6.13^*)$$

Fig. 6.5: Properties of transformation of the electromagnetic field.

6.5 Equations of transformation

As a consequence of the in fig. 6.5 again written down laws of transformation of the electromagnetic field (6.10 and 6.10*) magnetic phenomena can be traced back to electric phenomena and vice versa. The mathematical formulation reveals us the two sides of the same medal and points to a perfect duality between both fields and their factors of description.

Because a way exists, as is shown here, in which the equations of transformation can be derived from the Maxwell field equations, the same generally valid and extensive importance should be attributed to them. They can with the same right be called the foundation of electromagnetism. Wherein does lie its message for physics, the always curious researcher will ask? For that the relations of material 3.5 and 3.6 are completed:

$$\mathbf{E} = \mathbf{v} \times \mu \cdot \mathbf{H} \quad (6.10) \qquad \text{und} \qquad \mathbf{H} = -\mathbf{v} \times \varepsilon \cdot \mathbf{E} \,. \quad (6.10^*)$$

The here presented equations state, that we measure an electric field strength E, if we are moving with regard to a magnetic field H with the speed v and vice versa. The electric and the magnetic field therefore prove to be an experience of the observing person and we can say:

We experience the magnetic field as electric field and the electric field as magnetic field simply and solely for reason of the relative motion!

Let's assume, v is the component of the relative velocity (6.8), which stands perpendicular to the area defined by the field pointers (6.8*), then the equations of transformation (6.9* with 3.5) now read:

$$E = v \cdot \mu \cdot H \quad (6.11) \qquad \text{and} \qquad H = -v \cdot \varepsilon \cdot E \,. \quad (6.11^*)$$

If we are moving with the velocity v in a basic field which is present with the field strength E, then according to equation 6.11* we observe a magnetic field, which again according to equation 6.11 is to be interpreted as an additional electric field E_z:

$$E_z = -v^2 \cdot \mu \cdot \varepsilon \cdot E = -(v^2/c^2) \cdot E \quad (6.12)$$

In duality equation 6.11 inserted into equation 6.11* provides for the magnetic field strength a corresponding additional field H_z:

$$H_z = -v^2 \cdot \mu \cdot \varepsilon \cdot H = -(v^2/c^2) \cdot H \quad (6.12^*)$$

W e obviously owe the measurable overlap fields in a laboratory simply and solely to the relative velocity v with which the laboratory is moving. But now we must pay attention to the fact that a terrestrial laboratory rotates along with the earth, that the earth orbits the sun and the sun again rotates around the centre of the milky way. Eventually the whole milky way is on the way in the cosmos with a galactic, for us hardly understandable speed. If we further take into consideration that for every subsystem an additional field occurs as a consequence of the relative motion with regard to the super ordinate system, then one additonal field follows after the next and overlaps this one.

Let's imagine, the relative velocity could be reduced towards zero - and maybe we are moving around such a cosmic point - then here no overlapping field would be measurable.

<*>: A derivation using vectors is written in chapter 28 (part 3).

Additional field (from fig. 6.5):

(6.12)
(6.12*)

$$E_z = -(v^2/c^2) \cdot E \quad \text{and}$$
$$H_z = -(v^2/c^2) \cdot H$$

Superposition of the fields:
The additional field (E_z resp. H_z) overlaps the basic field
(E resp. H) to produce the measurable overall field (E_0 resp. H_0):

(6.13)

$$E_0 = E + E_z = E \cdot (1 - v^2/c^2) \qquad (6.13^*)$$
$$H_0 = H + H_z = H \cdot (1 - v^2/c^2)$$

transformed:

$$(1 - \frac{v^2}{c^2}) = \frac{E_0}{E} = \frac{H_0}{H}$$

(6.14)

for the Lorentz contraction holds apart from that:

(6.14*)

$$(1 - \frac{v^2}{c^2}) = (\frac{l}{l_0})^2$$

From the comparison
Follows

(6.14**)

$$\frac{E_0}{E} = \frac{H_0}{H} = (\frac{l}{l_0})^2$$

the proportionality:

$E, H \sim 1/l^2$ and $E_0, H_0 \sim 1/l_0^2$ (6.15)

Fig. 6.6: The field dependency of the Lorentz contraction

6.6 Field overlap

Field vectors can be superpositioned. In this manner the additional field E_z resp. H_z which depends on the velocity, according to equation 6.10, overlaps the respective basic field (E resp. H) to produce the measurable overall field (E_0 resp. H_0):

$$E_0 = E + E_z = E \cdot (1 - v^2/c^2) \quad (6.13)$$

$$H_0 = H + H_z = H \cdot (1 - v^2/c^2) \quad (6.13^*)$$

In the result something surprising the factor $(1\text{-}v^2/c^2)$ appears, which is well-known from the special theory of relativity and for instance appears in the Lorentz contraction.
If we rewrite both equations for the characteristic factor and compare with the in a purely mathematical way, over the Lorentz transformation, won length contraction $(1 - v^2/c^2) = (l/l_0)^2$, then it becomes clear that the Lorentz contraction physically seen should have its cause in the changed field conditions which a with relativistic speed moving body finds with regard to a resting body.

$$1 - \frac{v^2}{c^2} = \frac{E_0}{E} = \frac{H_0}{H} \stackrel{!}{=} \left(\frac{l}{l_0}\right)^2 \quad (6.14)$$

The equation is a compulsionless consequence of known physical laws. In this derivation actually no new factor was introduced and nevertheless a completely new picture for the natural scientific reality results<i>.

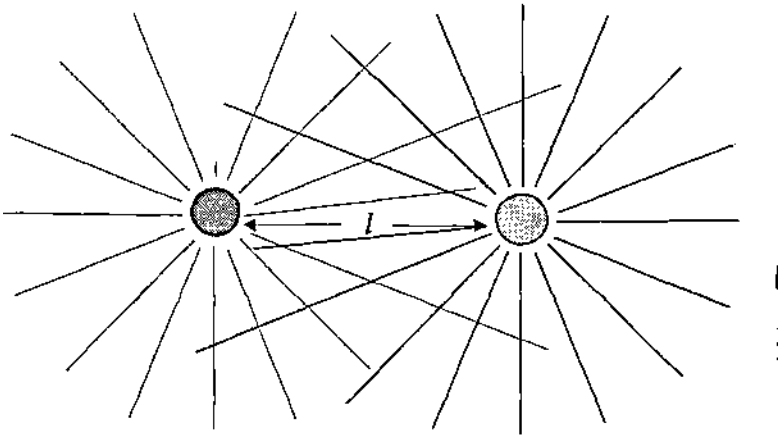
In our observer system, where the field E_o exists, a rule has its proper length l_0. In another system, which is moving with the speed v relative to the observer, as a consequence of the here prevailing field E the corresponding rule has a length 1. In which relation the factors stand to each other, is described by equation 6.14. Accordingly the following proportionality holds:

$$E, H \sim 1/l^2 \quad \text{and} \quad E_0, H_0 \sim 1/l_0^2 \quad (6.15)$$

If we are exterior to a very fast moving body with velocity v, we immediately can observe how this body for reason of its relative velocity experiences the calculated additional field and in this way experiences a length contraction. If the observer is moving along with the body, then he purely subjective seen doesn't detect a length contraction, because he himself and his entire measuring technique is subjected to the same length contraction. From the axiomatic approach what would be, if the field, which itself only represents an experience, would determine perceptible space and its dimensions, quickly a fundamental realization can develop if the described experiences should coincide with real observations.

<i> : Because in this point of view the subjective status of the observer is determining, it is not completely impossible that there is an error in the interpretation of the equations of transformation (6.10 and 6.10*). But because we started from the same point of view of the observer for the derivation of the length contraction from the Lorentz transformation, here the same error is to be expected. In putting both results equal (6.14), a like constituted error on both sides will cancel out in any case and the result stays above all doubts!

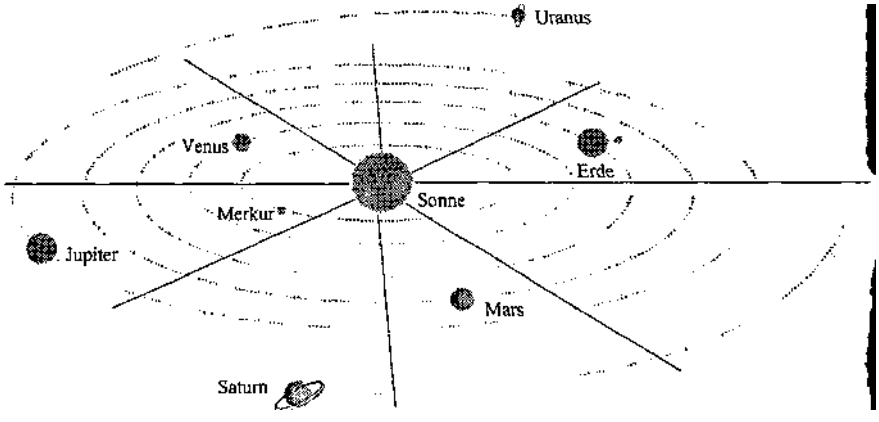
$$E, H \sim 1/l^2 \quad \text{and} \quad E_0, H_0 \sim 1/l_0^2 \qquad (6.15)$$



(Model):

Two particles of matter each in the field of the other particle.

Two elementary particles or two accumulations of matter consisting of these are able to reduce the distance to each other for reason of their fields, which we interpret as a force of attraction.



B: (Example): The orbits of the planets in the field of the sun.

Fig. 6.7: The influence of the field on interactions.

6.7 Field dependent curvature of space

Let's assume, an accumulation of matter, as big as our earth, wanted to fly past the sun in the distance earth-sun. But it would not succeed. Because the fields arising from the sun decreases with increasing distance and according to equation 6.15 as a consequence the size of the particles of matter increases. The planet hence is more strongly contracted on its side turned towards the sun, as on the turned away "night side". It bends towards the sun and its flight path becomes a circular path around the sun. That is the interaction known as gravitation!

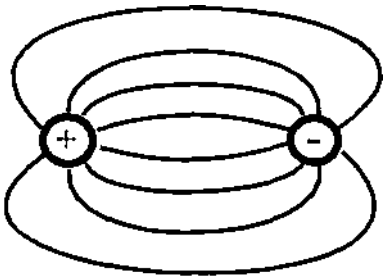
To an earth inhabitant this curvature reveals itself merely in the observation that the duration of sunshine at daytime is longer, than it would be expected to be under the assumption of the earth as a homogeneous sphere. In this context one willingly speaks of a curvature of space. Actually it is a curvature of matter under the influence of the field dependent length contraction.
Exactly this contraction the planets owe their circular orbits around the sun and by no means the equilibrium of forces between the force of attraction and the centrifugal force (fig. 6.7 B). It obviously is a fundamental mistake to think that gravitation would causally be connected with a force effect!
If, in this context, we speak of a force of attraction for the sake of our subjective observation, then we must realize that it merely can concern an auxiliary term founded in usefulness.

A thought experiment should bring us clarity (fig. 6.7 A). The field, which surrounds every particle of matter, reaches till infinity but becomes less effective with increasing distance. If the distance between two particles is 1, then one particle is in the field of the other particle. As a consequence of the field the length 1 reduces and in this way the size determining field increases, which again leads to a further reduction of length etc. As a consequence it can be observed that both particles are moving towards each other. We speak of a force of attraction, because we can't register the influence of the field with our senses.
In this way the consistent result that we and our environment at daytime must be smaller than in the night will as well remain hidden. We experience the effect only indirectly as gravitational pull of the earth.

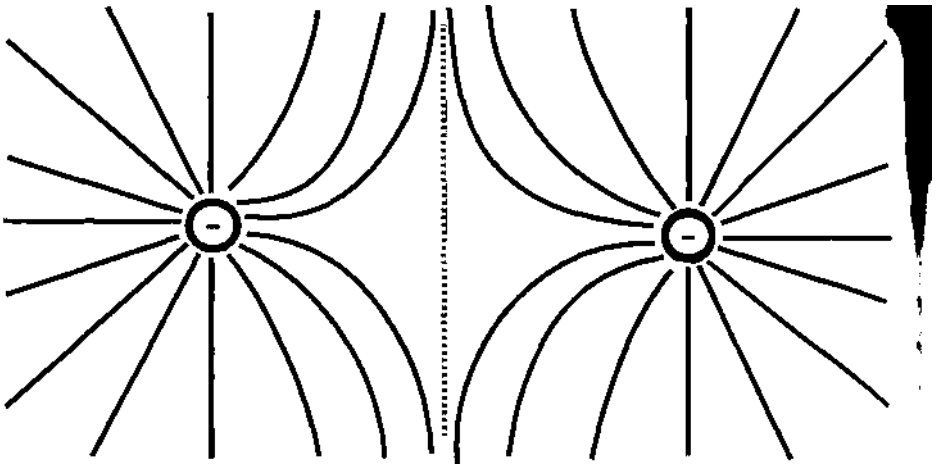
Because we don't see the cause of a subjectively observed force effect, for the electromagnetic interaction, just as for the gravitation, the field dependency of the length contraction will be responsible. Hence the following conclusion holds for both interactions equally way.

Two elementary particles or two accumulations of matter consisting of these are able to reduce the distance to each other for reason of their fields, which we interpret as a force of attraction.

Now the question still is open, why gravitation only knows forces of attraction, whereas the electromagnetic interaction also permits forces of repulsion and which are the causal fields for each.



A: The field lines of the E-field for unlike charged particles



B: The field lines of the E-field for equal charged particles

The electromagnetic interaction of a particle is a result of the influence of the open field lines arising from it on the dimensions of space.

Fig. 6.8: The influence of the open field lines of the E-field

6.8 Electromagnetic interaction

A convincing answer to the open question provides us the analysis of the course of the field lines, on the one hand for charged particles and on the other hand for uncharged particles, which do not participate in the electromagnetic interaction.
If at first we consider electrically charged particles, like e.g. electrons, protons or ions.
Then all in common is that the towards infinity running field lines of the electric field are open. With this field the particle is able to interact with its environment. We measure a charge and an electromagnetic force effect. In the case of unequal charges, as is well-known, a field amplification and attractive acting forces are observed whereas for equal charges a field reduction results and repulsion is observed.

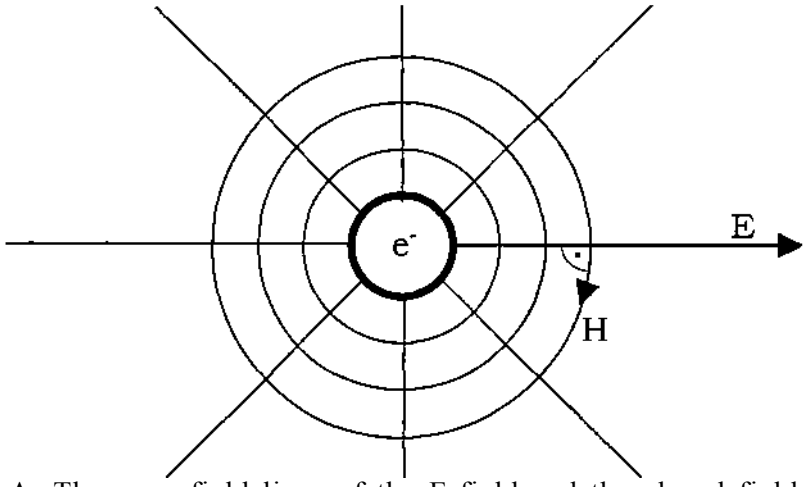
If we make a connection between the field conditions and the electromagnetic interaction in the sense of the proportionality (6.15), then the particle in reality is able to influence the distance to other particles merely with the help of its electric field. For unequal charges a compression of field lines arises, in which one particle stays in the focussed field of the other and vice versa. In this way a contraction of all lengths occurs and the observable attraction happens (fig. 6.8 A).
For equal charges the opposite case is present, in which even a local field freedom can occur (fig. 6.8 B). If the field tends towards zero on the dashed line, then the distance will go to infinity (according to eq. 6.15). Consequently, the observable effect that both bodies go away from each other, will reach to infinity.

Actually the electromagnetic interaction proves to be a result of the field dependent length contraction.

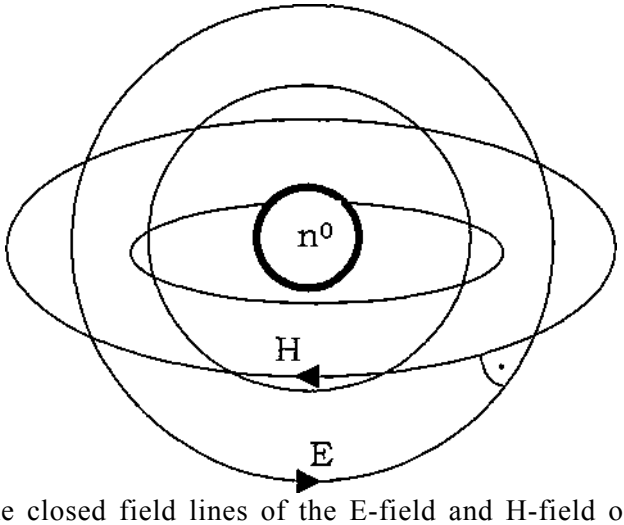
The electromagnetic interaction of a particle is a result of the influence of the open field lines arising from it on the dimensions of the space, in which it is.

It is important that the field lines are open, for which reason they are bent away from like charges and are directed towards unlike charges. Subjectively seen we find out that as a consequence of the field reduction repulsive force effects and as a consequence of the field compression attractive acting force effects are observed (fig. 6.8).
The consequence of is every electric field is, as is well-known, a magnetic field standing perpendicular on it. The field lines of the magnetic field run parallel to the surface of the particle and have a closed course (fig. 6.9 A)!
Therefore no magnetic poles form, which would be measurable. Seen from the outside the particle behaves neutral magnetically seen, because of the closed course of the field lines.
An artificial field reduction and as a consequence observable forces of repulsion, like in the case of the electromagnetic interaction, hence in principle are impossible.

The effect of the magnetic field thus is limited to a geometrical manipulation of the environment, namely the curvature of space, with which we have founded the phenomenon of the attraction of masses and of the gravitation.



A: The open field lines of the E-field and the closed field lines of the H-field of an electrically charged particle (e.g. e-)



B: The closed field lines of the E-field and H-field of an electrically uncharged particle (e.g. of the neutron n°).

Gravitation is a result of the influence of the field lines with a closed course running parallel to the surface of the particles on the dimensions of the space, in which they are.

Fig. 6.9: The influence of the closed field lines of the H-field.

6.9 Gravitation

For uncharged, neutral particles (neutron, atom, molecule etc.) both the magnetic and the perpendicular on them standing electric field lines have a closed course. Now both run parallel to the surface of the particle (fig. 6.9 B).
As is said, the density of field lines with a closed course can't be influenced from the outside. If we approach a particle, the consequence of an increase of the density without exception is a decrease of the linear measures and thus a larger force of attraction. For this case of field lines with a closed course, for which in general it doesn't give a field attenuation and no forces of repulsion, there holds:

Gravitation is a result of the influence of the field lines with a closed course running parallel to the surface of the particles on the dimensions of the space, in which they are.

Both interactions logically have an infinite range. Both form a whole in the influence of the fields on the size conditions.
It surely is of the greatest importance that for this derivation of the field dependency of the Lorentz contraction from the known equations of transformation of the electromagnetic field we could do completely without the introduction of new factors of description or neglects.
Solely by consistent derivation and interpretation of the result the unification already has suceeded and the electromagnetic interaction and the gravitation could, with the derived field dependent Lorentz contraction, be traced back to a single basic phenomenon. Doing so we have to pay attention to the fact that the observer is subjected to the same Lorentz contraction as his measuring technique and therefore he can't see the field dependency at all. Merely as being an exterior observer it in rare cases will be possible to him to see the curvature of space in the presence of strong fields.

From this for an astronaut practical consequences result. If he namely would land on Jupiter, he would think flat hills to be gigantic mountains, that small he would be! Vice versa if he landed on the moon, high mountains would appear to be insignificant hills, not because of wrong altitude readings of the terrestrial mission control and measurement centre, but only because of his own body size. The astronauts of the Apollo missions were not prepared for this circumstance and after their landing on the moon were completely surprised, how little validity learned textbook physics has, hardly has one left the earth. They have brought photographs with them which prove the Lorentz contraction to depend on the field and therefore on gravitation.

The fact that force effects should arise from the interactions is an auxiliary concept and auxiliary description of the observing person founded in pure usefulness. The Lorentz force therefore shouldn't be regarded as cause anymore. It actually appears only as property of the field factors. Seen this way it only would be consistent to do without space charges and currents as a result of moving charges and to assume a source-free and quanta-free field description (fig. 6.4: $j = 0$).
From an unified theory it is demanded that it besides the electromagnetic interaction and the gravitation also is able to integrate the strong and the weak interaction. We will also solve this problem.

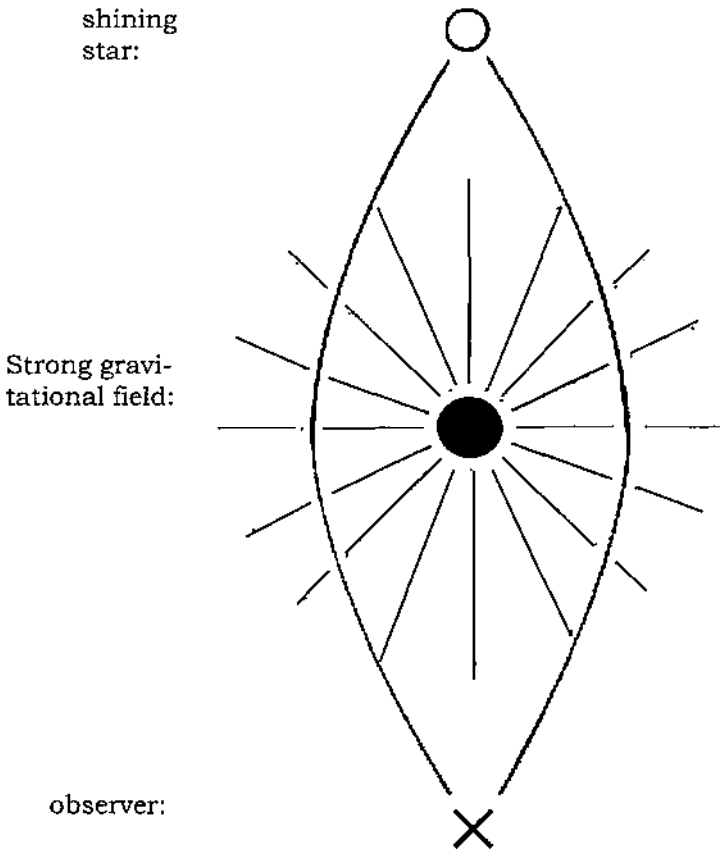


Fig. 6.10: Diversion of the light by a strong gravitational field.

Speed of light of the wave: $c = \lambda * f$ (6.16)

For the wavelength λ holds (because of eq. 6.15): $E, H \sim 1/\lambda^2$

From equation (6.16) follows (with f = constant):

$$E \sim 1/c^2 \quad , \quad H \sim 1/c^2 \qquad (6.17)$$

The speed of light depends on the field!

6.10 Field dependent speed of light

But not only matter is bent towards a gravitational field. If we only think of the much cited phenomenon that the ray of light of a star is diverted towards the sun, if it passes very close to the sun on its way to us, like this has been observed for the first time during an eclipse of the sun in 1919 (fig. 6.10).
Quite obviously the field of the sun also slows down the speed of light. On the side of the ray of light which is turned towards the sun, the field is somewhat larger and the speed of light correspondingly is slower than on the side which is turned away, and with that the ray of light changes its direction in the observable manner. Exactly this relation willingly is interpreted as a consequence of a curvature of space.
The extremely strong field of a black hole can divert the light down to a circular path, in order to in this way catch and bind it. The light now orbits the black hole like planets the sun.

At this point the open-minded reader already might have tapped the confirmation of the proportionality 6.2 ($c \sim r$), which has been derived from the vortex model (fig. 6.2).
The sceptic is offered still another derivation: for the borderline case that the relative velocity v tends towards the speed of light c (fig. 6.6), according to equation 6.13 the measurable overall field E_o (and also H_o) will go to zero and equation 6.12, with $E_z = - E$ (and $H_z = - H$), will again turn into the wave equation (5.9*) after double differentiation (fig. 6.4).
The speed $v = c$ so to speak forms the escape velocity, with which the electromagnetic wave runs away from the cosmic field. Under these circumstances of course neither an attraction of masses nor an electromagnetic interaction can be exerted on the wave.
If E_0 goes to zero at the same time l_0 tends to infinity (equation 6.15, fig. 6.6): i.e. the wave spreads all through space. This result entirely corresponds to the observations and experiences.

For the wave length λ and in the end for the velocity of propagation c only the self-field of the wave E resp. H is responsible. Because of

$$c = \lambda \cdot f \qquad (6.16)$$

and the proportionality from equation 6.15: $E, H \sim 1/\lambda^2$ (6.17*)

obtain the new relation: $E, H \sim 1/c^2$ (6.17)

If the speed of light in the presence of matter decreases, then we now also know why. It is the field, which surrounds matter, that slows down the speed of light. Therefore a gravitational field is able to divert a ray of light in the same manner as matter which flies past. Finally moves the speed of light in the proportionality 6.17 to the place of the linear measure (in 6.15).
But if the rule fails one will try to replace by an optical measurement arrangement. In this manner the field dependency of the Lorentz contraction should be measurable; but it isn't!

From the comparison of the derived proportionalities:

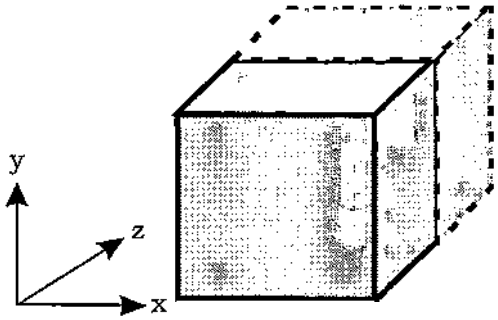
$$E, H \sim \frac{1}{l^2} \sim \frac{1}{c^2} \qquad \text{(6.15): (6.17)}$$

follows:

$$1 \sim c \qquad (6.18)$$

The speed of light is proportional to the measurement path. The variable speed of light is being measured with itself. The result at all events is a constant value.

The constancy of the speed of light is based on a measurement which is faulty from the principle!



Because of c ~ r: physical length contraction

Fig. 6.11: Derivation of the length contraction (field dependent Lorentz contraction)

6.11 Universality

Why can't the rule be replaced by an optical measurement arrangement? The crucial indication provides the comparison of both derived proportionalities 6.15 and 6.17. According to them holds the same field dependency for both the Lorentz contraction and the speed of light:

$$1/l^2 \sim 1/c^2 \text{ or } \underline{\overline{1 \sim c}} \qquad (6.18)$$

If the rule has proved to be useless, then we will experience the same disaster if we measure optically, i.e. with the speed of light.
Obviously both, the length 1 and the speed of light c as a length per unit of time, depend in the same manner on the respective local field strength. On the one hand do both measuring methods lead to the same result; but on the other hand will anything which can't be measured with one method, neither be measured with the other method.
If now the speed of light is being measured optically, then the measurement path will be proportional to the speed of light and as a result will the unknown factor be measured with itself. The result of this measurement, which is faulty from the principle, at all events is a constant value, because here two variables which stand in direct proportionality to each other are related to each other.
Was the famous experiment of Michelson and Morley unnecessary, the result trivial? And how does it stand about the postulate of the universality of the speed of light?
If we for that consider a cube (fig. 6.11). And we assume that the speed of light is a vectorial quantity, which in our experiment is for instance in one direction twice as large, as in the direction of the other two space axes. By means of the mentioned influence of the speed of light on the spatial length is, as a consistent consequence, the cube along this edge pulled apart to a cuboid. We however register this spatial body with our eyes, which is with the speed of light and that has increased proportionally to the length of the edges, for which reason we as subjective observer still see a cube in front of us and not a cuboid.
If we trust an apparent objective measurement more than our sense organ and measure the three lengths of the edges of the cuboid again with a rule then we get three times the same length, which is a cube.
We probably are dealing with an optical deception using the true meaning of the word.

If the by Einstein postulated universality and constancy of the speed of light in reality doesn't exist at all, we in no way would be capable to register this; neither to observe nor to measure it!
The Galilean theorem of the addition of speeds objectively seen still is valid, even if the fact that the speed of light apparently is independent of the speed of the source pretends us the opposite.
If for instance a light source is moved towards a receiving device or away from it, then the speeds will overlap, like for the passenger, who marches in a driving train against or in the driving direction through the corridor. For the ray of light also the fields, which influence the speed of light and the measurement equipment, overlap. As a consequence will a measuring technician, who himself is exposed to this overlapping field, always observe and "measure" the identical speed of light. The observer as a result imagines, there is an universality of the speed of light.

The field takes over the function of the aether.

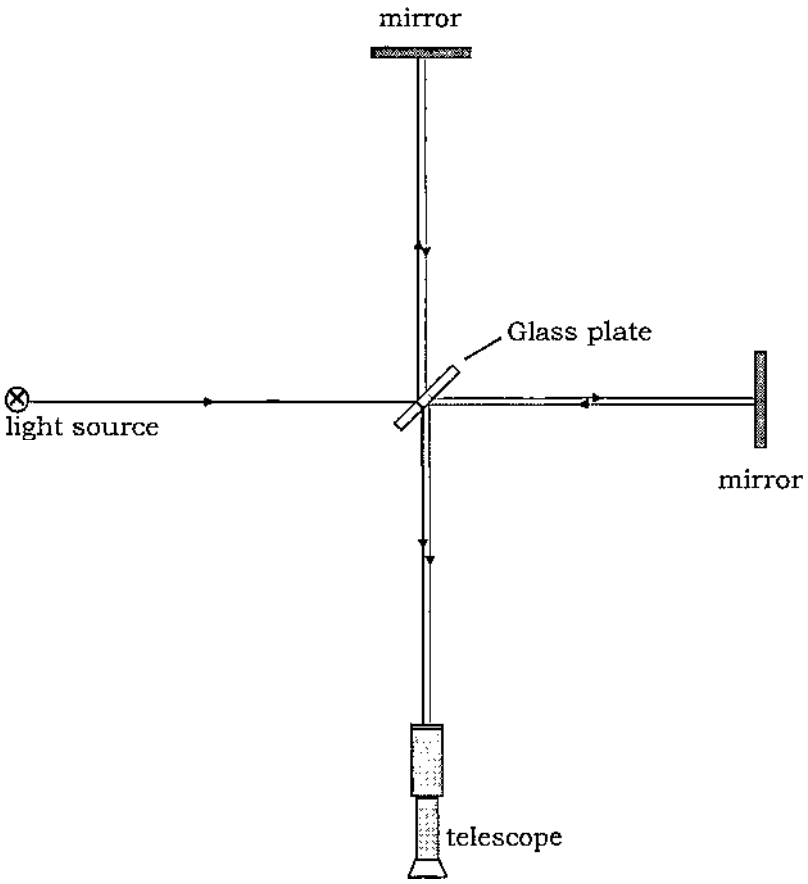


Fig. 6.12: Experiment of Michelson and Morley to detect an aetherwind<i>

<i>: A.P.French: Special Relativity, Massachusetts Institute of Technology, 1966.

<ii>: Nikola Tesla: "This is the same as writing a business letter and forgetting the subject you wish to write about". To Einstein's Theories, Rare Book and Manuscript Library, Columbia University, 15.4.1932.

<iii>: Einstein proceeds in the same manner with the time dilatation, by assuming a time constant by definition for the derivation to present at the end of his derivation a variable time. And with that he presents a result which contradicts his approach completely.

6.12 Aether

Important experiments like the one of Doppler concerning the redshift or the one of Bradley concerning the aberration of the stars show only to clear, where the influence of the speed of light subjectively still is perceptible, or for laboratory experiments like the one of Michelson and Morley, where the influence isn't perceptible anymore, because the length of the interferometers always changes proportionally to the speed of light. The look in the stars at the same time is a look in cosmic areas, where completely other field conditions prevail and as a consequence completely other values for the speed of light and for the dimensions of space are present. The mentioned observations suggest that we together with our measuring station are moving through the cosmos and therefore a relative velocity has to be present with regard to an aether which determines the respective speed of light.

If we however constrict our range of vision and retire in a laboratory, then we no longer are capable to observe the influence of the field on the speed of light. The experiments of Michelson which Maxwell had prompted to and which Morley with a higher precision had repeated with the goal, to detect the aether, inevitably had to turn out negatively. The laboratory experiments resulted in the misleading picture, as if the earth was resting in the aether.

The not understood measurements will suggest any observer, he forms the centre of the universe and everything rotates around him, entirely in the sense of the Ptolemean view of life, which, although long ago abolished, here belated has experienced support. With a Swabia caper Albert Einstein has prevented a relapse into the dark Middle Ages and removed the open contradiction in the question of the aether, which once is measured as moving and another time as resting, by without further ado abolishing the aether. With that he undoubtedly has solved a central problem of physics and at the same time created a new one. As is known does the speed of light have a certain value, and therefore the question is raised, what determines is size. Exactly for this purpose a luminiferous aether had been introduced, however it is constituted.

Scientifically it does make little sense, to make an assumption, if at the end of the derivation the prerequisite is deleted without substitute. In such a case either in the approach or in the derivation is a principal error*[1]"*. Nikola Tesla comments on the working method of Einstein with the applicable comparison, as if Einstein had, while he was writing a business letter, forgotten completely the subject he wanted to write about (fig. 6.12[ii]).

The answer, which removes all contradictions and is entirely in accord with all observations and measurements, is obvious. Naturally a luminiferous aether exists, which determines the velocity of propagation and of course it by no means is bound to the observer.

As has been derived in figures 6.5 and 6.6, will for a relative velocity v arise a field, which according to proportionality 6.17 determines the speed of light. With that we have derived completely.

The field takes over the function of the aether.

The equations 6.10 also answer the question, why no aetherwind is being observed, although such a wind actually is present: we experience, as we have discovered, an E-field with „head wind" as a resting H-field and vice versa and therefore we aren't capable to detect the head wind in the aether!

Key questions of quantum physics (fig. 4.4 + continuation):

IV. Why do the particles have the form of spheres?
(with increasing E-field decreases c)

VIII. Why is the elementary quantum localized?
(in the vortex centre: c = 0, see figures 4.3 and 6.2)

IX. Why do the elementary particles have a spin?
(spherical form demands field compensation)

X. Why is the magnitude of the spin quantized?
(cosmic basic field determines the need of E_z)

XI. Why can speeds faster than light occur in a tunnel?
(a reduction of the cosmic basic field can only be realized locally in a tunnel)

to XI:

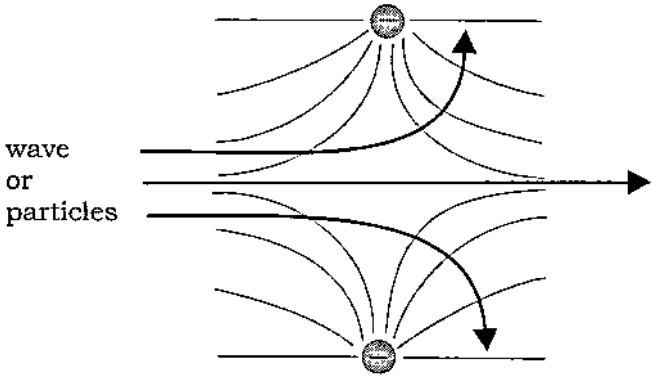


Fig. 6.13: Consequences concerning the field dependency of the speed of light: spin effect and tunnel effect <i,ii>

<i>: Nimtz,G.: Instantanes Tunneln, Tunnelexperimente mit elektromagnetischen Wellen, Phys.B1.49, VCH Weinheim (1993) Nr.12, S. 1119-1120<*>
<ii>: Thoma, P., Weiland.T.: Wie real ist das Instantane Tunneln? Phys.Bl.50, VCH Weinheim (1994) Nr.4, S. 359-361<*>
<*>: The measurement results are in accord with the theory of objectivity, not however the contradictory attempts to interpret them <i> and <ii> et al.

6.13 Spin and tunnel effect

Only with the field dependency of the speed of light (6.17) we can understand, why the elementary quanta can form as spheres, like is drawn in the figs 4.3 and 6.2. In the centre the field lines run together, i.e. the field increases and the speed of light decreases. Only in this way it will be possible for the vortex oscillation to everywhere occur with the speed of light, even in the inside of the particle! In the centre of the vortex particle the field in theory will become infinitely large and the speed of light zero. This circumstance again is the foundation why the elementary particles are localized and it answers key question VIII of quantum physics. The absence of a speed after all is the characteristic of an immobile thing.

The field dependency of the speed of light answers also further basic and up to today unanswered key questions of quantum physics, like why the elementary particles have a spin (IX) and why the magnitude of the spin is quantized (X).

A vortex particle after all does not exist alone in the world, but it is in the field of other particles. We can call this the cosmic basic field (E resp. H). This basic field overlaps the self-field and takes effect the strongest in the area of the spherical shell, where the self-field is correspondingly small. In order to keep the form of a sphere, this influence of the basic field has to be compensated. The additional field (E_z resp. H_z according to eq. 6.12) necessary for the compensation is produced by the particle, by rotating in a spiral around itself with a speed v which increases towards the outside of the spherical shell. Therefore does the elementary particles have a spin. The electron spin is therefore determined by the cosmic basic field.

Another effect of the field dependent speed of light is the tunnel effect. As an example we consider the two differently charged particles shown in fig. 6.8 A. The open, outside of the particles running, field lines of the electric field are predominantly bent towards the each time oppositely charged particle. If another particle wants to pass between the two, then it gets into an area of increased field strength. As a consequence it will be slowed down, because here a smaller speed of light is present.

Water molecules show with their polar nature exactly this property. Water has a remarkably high dielectricity e and slows down the speed of light correspondingly according to equation 5.6 ($\varepsilon \cdot \mu = 1/c^2$). The refraction of light at the water surface is an observable result of the reduced speed of light in the presence of matter.

If we now examine the case in which the two particles have the same charge as is shown in fig. 6.8 B (and fig. 6.13 belonging to XI). The field lines repel each other, so that exactly in between the two particles a field free area forms, in which the speed of light goes to infinity! This area acts like a tunnel. If we send through a particle exactly here, then purely theoretically seen it won't need any time to run through the tunnel, and for a short time the signal becomes infinitely fast.

If a particle hits only slightly besides the tunnel, then it will one-sidedly be slowed down and diverted by the respective field. We call this process reflection or scattering. Only the few particles, which exactly hit the tunnel, arrive behind the hurdle and in the ideal case even almost without loss of time!

The current measurements of speeds faster than light demonstrate in a convincing manner the superiority of the field-theoretical approach with regard to the nowadays normally used quantum physical approach.

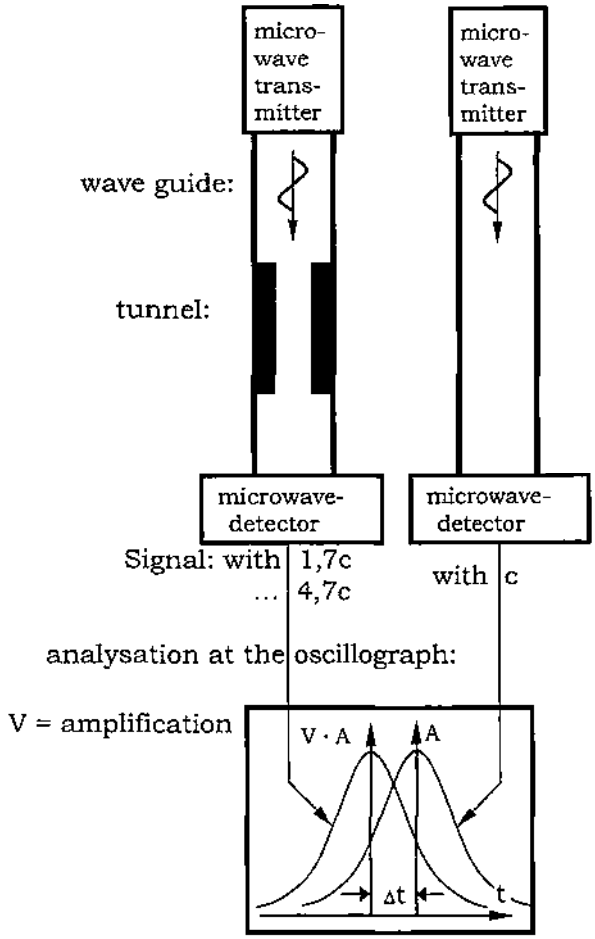


Fig. 6.14: The microwave experiment at the II. Physical Institute of the University of Cologne to measure speeds faster than light.<i>

<i>: Nimtz, G. : New Knowledge of Tunneling from Photonic Experiments, Proc. of the Adriatico Research Conference, 1996, World Scientific Publishing Company

6.14 Interpretation of the measured speed faster than light

Now the attempt can be undertaken, to interpret the spectacular experiments, in which a speed faster than light has been measured. It is reported<i> that in experiments with photons at the University of California in Berkeley on an average a speed of 1.7 times the speed of light has been measured by Prof. Raymond Chiao and his co-workers. At the Technical University of Vienna Prof. Dr. Ferenc Krausz already has obtained 2.4 times the, according to Einstein at maximum obtainable, speed of light with tunnelling laser light.

The first measurements of speeds faster than light have been carried out with microwaves at the University of Cologne<ii> by Prof. Dr. Gunter Nimtz and co-workers. They at first had published the measurement of a speed 2.5 times the speed of light. In the meantime they even have transmitted a symphony of Mozart with a speed almost 10 times the speed of light and with that have contradicted Einstein's hypothesis, according to which the speed of light in vacuum would be the highest possible speed for the transmission of signals. The different experiments only resemble each other in the point that the particles have to tunnel, because one has put a barrier in their way. This "tunnelling" apparently is the cause for obtaining speeds faster than light. With the prevailing physical view of life these measurement results are incompatible.

In the measurement set up in Cologne the microwaves are sent through a wave guide, which they pass with the speed of light. If a parts with narrowed cross-section is inserted, where the microwaves actually don't fit through at all, then the signal gets damped strongly. Now however arrives nevertheless a small part of the signal at the other end of the wire, but much faster than allowed, namely with the measurable speed faster than light.

The answer of the here presented potential vortex theory reads as follows: the waves picked up by the wave guide run up to the entry of the tunnel, in order to find out that they don't fit through. They are reflected or absorbed. A small part however rolls up to potential vortices and these fit through the tunnel. They however have to be compressed additionally. In the derivation of the photon (fig. 4.5 and 4.6) we had seen that the inner vortex always is faster than the bigger one, through which it slips through. The compression therefore causes an increase in speed. In flow dynamics is known an analogy: the Venturi-tube. The flow-technical potential vortices also confirm exactly this property. One can as well start with the Lorentz contraction (fig. 6.6, eq. 6.14*). This states that a particle moving with a higher speed actually becomes smaller and not only appears to be smaller as an optical deception of the observer. Because only smaller particles fit through the tunnel, the particles, measurable at the other end, must be correspondingly faster: quod erat demonstrandum. In the same manner also the experiments of Berkeley can be explained physically, because here is worked with photons from the start<i>. With that the process of rolling up the wave can be left out. The tunnel lets pass only compressed and therefore faster light particles.

<i>: R.Y.Chiao, P.G.Kwiat, A.M.Steinberg: Schneller als Licht? Spektrum der Wiss. 10/93

<ii>: B. Schuh, Gespenstisch fixe Wellen, DIE ZEIT Nr. 45, 5.11.93, S. 43.

<ii>: Enders, A., Nimtz, G.: Photonic-tunneling experiments, Physical Review B, Vol. 47, No. 15 (1993), pp. 96O5-96O9.

<ii>: Enders, A., Nimtz, G.: Evanescent-mode propagation and quantum tunneling, Physical Review E, Vol. 48, No.l (1993), pp. 632-633.

"The theory of relativity is not a physical theory... it is a mathematical poetic idea, a deduction from impossible premises."[<i>]
Oskar Kraus

"The theory of relativity is a mathematical masquerade, behind which is hidden an inextricable ball of a mixing up of ideas, contradictions, fallacies, arbitrary assumptions and ignoring of healthy logic."[<i>]
Erich Ruckhaber

"The theory of relativity not only is fantastic, but also of an inconsistency which in the history of science not yet has been present."[<i>]
Harald Nordenson

"A physics of hybrids, of contradictions and fantastic confusions, nonsense!"[<ii>]
Johann Marinsek

"This is absurd."[<iii>] (regarding mass-energy interpretation)
Nikola Tesla

"In my experiments I have destroyed billions of atoms, without having observed any emissions of energy. "[<4i>]
Nikola Tesla

Fig. 6.15: Some statements regarding the theory of relativity.

<i>: Walter Theimer: Die Relativitatstheorie, Seite 7, Francke Verlag, Bern, 1977, ISBN 3-772O-126O-4
<ii>: Johann Marinsek: Rationale Physik, S. 163, dbv-Verlag TU Graz, 1989, ISBN 3-7O41-O176-1
<iii>: Nikola Tesla, To Einstein's Theories, Rare Book and Manuscript Library, Columbia University, 15.4.1932. Entnommen aus J.T.Ratzlaff: Tesla Said, Tesla Book Company, pp. 238, ISBN O-914119-OO-1
<4i>: Nikola Tesla, Franz Ferzak World and Space Publications 1985.

6.15 Definition of the speed of light

If a light signal propagates in space, then as a consequence of the velocity of propagation c, it at a certain point in time t is in a distance r of the light source:

$$r = c * t \quad (6.19)$$

Should the speed of light become smaller for instance by Δc, then the light signal obviously has covered a distance less by Ar or the time interval has changed by Δt:

$$r + \Delta r = (c + \Delta c) \cdot (t + \Delta t) \quad (6.20)$$

This equation describes purely mathematically the most general case which can be assumed. By writing out the multiplication and subtraction of equation 6.18 the change in distance considered for itself is:

$$\Delta r = c \cdot \Delta t + t \cdot \Delta c + \Delta c \cdot \Delta t \quad (6.21)$$

The answer of mathematics is that the change in distance can have its cause in a change in time, in a change of speed or in both. We now want to turn to the physical interpretation and have a closer look at the two possibilities, in which either c or t is to be taken constant (see fig. 6.16).

In the first case the speed of light c is constant and as a consequence the change Δc = zero. The mathematical formulation (according to eq. 6.21) therefore reads:

case 1: $\boxed{c = \frac{\Delta r}{\Delta t}}$ (relativity) (6.22)

If in this conception world a change in distance is observed, for instance the Lorentz contraction, then in order to save this relation inevitably a change in time, for instance a time dilatation, has to make the compensation. Einstein in an applicable manner speaks of relativity, because according to his opinion in the case of both variables, the length contraction and the time dilatation, it only concerns observed changes.

For the time dilatation experiments are given. But for the measurement of time always only atomic clocks are available and their speed of running of course could also be influenced by the Lorentz contraction. In any case it can't be claimed the time dilatation is proven experimentally as long as we do not know the mechanisms of decay of atoms. Otherwise the statements of the theory of relativity are familiar to us, for which reason further remarks seem unnecessary.

In the second case the time t is constant and consequently the change At = zero. At a closer look this case is much more obvious, since why should time change. After all time has been stipulated by definition.

After all, we are the ones who tell, what simultaneity is!

The mathematical formulation for this case reads (eq. 6.21 with Δt= 0):

case 2: $\boxed{\Delta c = \frac{\Delta r}{t}}$ (objectivity) (6.23)

This equation does open up for us an until now completely unknown and fundamentally other way of looking at the physical reality.

Concerning the definition of the speed of light c [m/s]:

r [m] = distance of the light source:

$$r = c \cdot t \qquad (6.19)$$

For changes, observed or measured:

$$r + \Delta r = (c + \Delta c) \cdot (t + \Delta t) \qquad (6.20)$$

$$= c \cdot t + c \cdot \Delta t + \Delta c \cdot t + \Delta c \cdot \Delta t$$

Change in distance:

$$\Delta r = c \cdot \Delta t + t \cdot \Delta c + \Delta c \cdot \Delta t \qquad (6.21)$$

2 possible causes:

with $\Delta c = 0$ case 1:	with $\Delta t = 0$ case 2:
$c = \frac{\Delta r}{\Delta t}$ (6.22)	$\Delta c = \frac{\Delta r}{t}$ (6.23)
c = constant	t = constant
$\Delta r \sim \Delta t$ (6.23)	$\Delta c \sim \Delta r$ (6.25 = 6.2)
= time dilatation	= universality
Δr = observable length contraction	Δr = physical length contraction
Theory of relativity	Theory of objectivity

Fig. 6.16: Theory of relativity and theory of objectivity, derivation and comparison.

6.16 Relativity and objectivity

New to the second case (equation 6.23) is particularly the proportionality contained in it:

$$\Delta c \sim \Delta r \quad (6.25 = 6.2)$$

But to us it is not new, because we have derived the same proportionality from the model conept (equation 6.2, fig. 6.2), in which the elementary particles are understood as spherical vortices.
Equantion 6.25 unconcealed brings to knowledge that any change of the speed of light c [m/s] in the same way leads to a change of the radius r [m], the distance between two points in space or even the length of an object, e.g. a rule. Such a rule after all consists of nothing but spherical atoms and elementary particles and for their radius r again the proportionality 6.25 holds. Therefore it is to be set:

$$r \sim 1 \qquad (6.26)$$

and taken both together we already had derived as equation 6.18 (fig. 6.11) from the field dependency. Here the vortex model as well finds a confirmation of its correctness, as in the derivation from the equations of transformation of the electromagnetic field. Because all three, the derivation according to the model, the physical and the mathematical derivation, lead to the same result, this second case should be called "objective".

With that the first case, which describes the subjective perception of an observer, is not supposed to be devaluated. It contains the definition of reality, according to which only is real what also is perceptible. The theory of relativity of Poincare and Einstein is based on this definition.

With the second case, the case with a variable speed of light, we however get serious problems, since we observe with our eyes, and that works with the speed of light. If that changes, we can't see it, as already said. If we could see it, then "reality" would have a completely different face and we surely would have great difficulties, to find our way around. In this "objective world" neither electromagnetic interactions nor gravitation would exist, so no force effects at all. Because all distances and linear measures depend on the speed of light, everything would look like in a distortion mirror.
The concept of an "objective world" at first has not a practical, but rather a theoretical and mathematical sense. The distinction between an observation domain and a model domain is founded in pure usefulness.

The observation domain should correspond to case 1 and the model domain to case 2. The mathematical derivation tells us, how we can mediate between both domains (equation 6.21): This mediation amounts to a transformation, which provides us the instruction, how a transition from the observation into a not perceptible model concept, from the relativity into an objectivity has to.

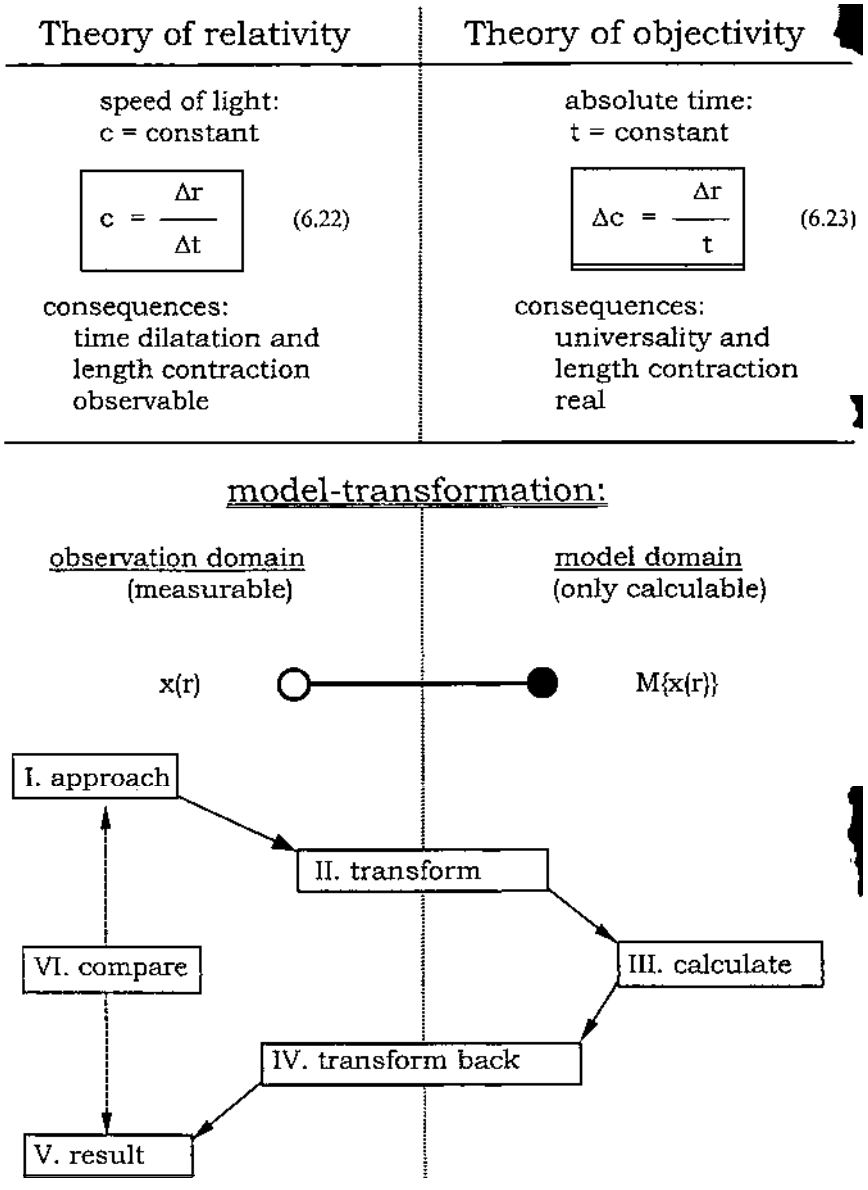


Fig. 6.17: Model-transformation between theory of relativity and theory of objectivity.

6. 17 Transformation

The observation domain is, as the name already expresses, perceptible (observable) with the help of our sense organs and measurable with corresponding apparatus. The special theory of relativity for the most part provides us the mathematics needed for that. And in that is assumed a constant speed of light. Because a length contraction is being observed and can be measured, a time dilatation must arise as a consequence. Such is the consistent statement of this theory. Because we already could make us clear that it concerns a subjective theory, of course caution is advisable if generalizations are being made, like the one of the inductive conclusion of the length contraction on the time dilatation. We'll come to speak about that in this chapter (fig. 6.20).

The model domain however is not observable to us and only accessible in a mathematical manner. Here the time is a constant. On the other hand do the radii of the particles and all other distances and linear measures stand in direct proportionality to the speed of light. If that changes, then does that lead to a change in length. The length contraction occurs physically, which means actually. We propose the name "theory of objectivity" for the valid theory which is derivable with this prerequisite and independent of the point of view of the observer.

The importance of this model domain and of the possible model calculations is founded in the circumstance that many physical relations within our observation domain aren't recognized by us and can't be mathematically derived. Besides is only all to often worked with unallowed generalizations and with pure hypotheses. Such a thing does not even exist in the model domain.

The model domain can be tapped over a transformation. For that we select an approach x(r) in the to us accessible observation domain. This then is transformed into the model domain by a calculation instruction $M\{x(r)\}$. Here we can calculate the sought-for relation In the usual manner and transform back again the result according to the same calculation instruction $M^{-1}\{x(r)\}$ but in the reversed direction. After being returned in our familiar observation domain, the result can be compared and checked with measurement results (fig. 6.17).
In this way we will derive, calculate and compare the quantum properties of the elementary particles with the known measurement values. Here we remind you of the fact that all attempts to calculate the quantum properties conventionally, without transformation, until now have failed. Not even a systematization may succeed, if it concerns for instance explanations for the order of magnitude of the mass of a particle.

A transformation at first is nothing more than an in usefulness founded mathematical measure. But if a constant of nature, and as such the quantum properties of elementary particles until now have to be seen, for the first time can be derived and calculated with a transformation then this measure with that also gains its physical authorization. We now stand for the question: how does the instruction of transformation $M\{x(r)\}$ read, with which we should transform the approach and all equations from the observation domain into the model domain?

general relations:	special theory of relativity	theory of objectivity
domain of validity:	observation domain	model domain
speed of light c [m/s]:	$c = c_0$ = constant	$c \sim r$ (6.25)
field strengths (6.15)	(6.15) + (6.18)	
H [A/m] :	$H \sim 1/r^2$	$H \sim 1/r$ (6.27*)
E [V/m] :	$E \sim 1/r^2$	$E \sim 1/r$ (6.27)
because of eq. (5.6) $\varepsilon \cdot \mu = 1/c^2$ is valid:		
μ [Vs/Am] :	μ_0 = const.	$\mu \sim 1/r$ (6.28*)
ε [As/Vm] :	ε_0 = const.	$\varepsilon \sim 1/r$ (6.28)
relations of material:		
$B = \mu \cdot H$ (3.5): B [Vs/m²]	$B \sim 1/r^2$	$B \sim 1/r^2$ (6.29*)
$D = \varepsilon \cdot E$ (3.6): D [As/m²]	$D \sim 1/r^2$	$D \sim 1/r^2$ (6.29)
e.g. spherical capacitor capacity: C [As/V]	$= \varepsilon 4\pi r$ (6.4)	C = const. (6.30)
charge: Q [As]	$= C \cdot U$ (6.31)	Q = const. (6.32)
energy: W [VAs]	$= Q^2/C$ (6.1)	W = const. (6.33)
with energy-mass relation: (5.24) and (6.1)	$W = mc^2$	
mass	m [kg = VAs^3/m^2]	$m \sim 1/r^2$ (6.34)
relaxation time	τ_1 [s]:	τ_1 = const. (6.35)
with	$\tau_1 = \varepsilon/\sigma$ (5.3)	
specific conductivity	σ [A/Vm]:	$\sigma \sim 1/r$ (6.36)

Fig. 6.18: Transformation of the dependencies on radius

6.18 Transformation table

The attempt to write down at this point already a closed mathematical relation as instruction of transformation, would be pure speculation. Such an instruction first must be verified by means of numerous practical cases, i.e. be tested for its efficiency and correctness. But we not even know the practical examples necessary for this purpose, if we apply the transformation for the first time!
For his reason it unfortunately is not yet possible, to calculate absolute values in a direct
We have to be content to work with proportionalities and to carry out comparisons.
In fig. 6.18 the proportionalities are compared in the way, how they would have to be transformed: on the left side, how they appear and can be observed in the view of the special theory of relativity, and on the right side, how they can be represented and calculated in the theory of objectivity.
The change, which here would have to be transformed, is the physical length contraction, which is the change in length as it depends on the speed of light. For spherical symmetry the length 1 becomes the radius r (eq. 6.26), of which is to be investigated the influence. In the observation domain we had derived the proportionality (6.15 + 6.18):

$E \sim 1/r^2$ and $H \sim 1/r^2$.

The field of a point charge or of a spherical capacitor confirms this relation:

$$E = Q/\varepsilon 4\pi r^2 .$$

Because the speed of light in our observation is constant, also both constants of material which are related to it (eq.5.6: $\varepsilon \cdot \mu = 1/c^2$), the dielectricity ε and the permeability μ, are to be taken constant.
With that the same proportionality as for the field strengths also holds for the induction B and the dielectric displacement D:

$$B \sim 1/r^2 \quad \text{and} \quad D \sim 1/r^2.$$

In the model domain everything looks completely different. Here the radius and any length stands in direct proportionality to the speed of light. In this way we get problems with our usual system of units, the M-K-S-A-system (Meter-Kilogram-Second-Ampere). The basic unit Meter [m] and as a consequence also the unit of mass Kilogram [kg = VAs^3/m^2] appear here as variable. It would be advantageous, to introduce instead the Volt [V] as basic unit.
But in any case does the dimension of a quantity show us, in which proportionality it stands to the unit of length. This in the model domain then is authoritative! As an example does the speed of light have the dimension Meter per Second. In the model domain there consequently has to exist a proportionality to the length r [m].
The speed of light determines with equation 5.6 again the constants of material:

$$\mu\,[Vs/Am] \sim 1/r \quad \text{and} \quad \varepsilon[As/Vm] \sim 1/r \qquad (6.28)$$

According to the model holds unchanged:

$$B\,[Vs/m^2] \sim 1/r^2 \quad \text{and} \quad D\,[As/m^2] \sim 1/r^2. \qquad (6.29)$$

But if we insert the proportionalities 6.28 and 6.29 into the equations of material 3.5 and 3.6, then holds for the field strengths:

$$H\,[A/m] \sim 1/r \quad \text{and} \quad E\,[V/m] \sim 1/r. \qquad (6.27)$$

Further dependencies of the radius can be read in the same manner either by inserting into well-known laws or immediately from the dimension.

In the observation domain:

energy density of a field:

$$w = (\varepsilon \cdot E^2 + \mu \cdot H^2)/2 \sim 1/r^4 \qquad (6.37)$$

energy: $W \sim 1/r$ (6.38)

with c = constant and $W = m \cdot c^2$: $\boxed{m \sim 1/r}$ (6.39)

e^- is bigger and lighter than p^+ or n^0!

$$\frac{m}{m_0} \overset{(6.39)'}{=} \frac{r_0}{r} \overset{(6.26)}{=} \frac{l_0}{l} \overset{(6.24^*)}{=} \frac{1}{\sqrt{1-(v/c)^2}} \qquad (6.40)$$

In the model domain:

e.g. spherical capacitor

capacity:	C [As/V]	$= \varepsilon 4\pi r$	(6.4)	C = const.	(6.30)
charge:	Q [As]	$= C \cdot U$	(6.31)	Q = const.	(6.32)
energy:	W [VAs]	$= Q^2/C$	(6.1)	$\boxed{W = \text{const.}}$	(6.33)

(6.33) means: law of conservation of energy!

relaxation time	τ_l [s]:			τ_l = const.	(6.35)
with	$\tau_l = \varepsilon/\sigma$	(5.3)			
specific conductivity	σ [A/Vm]:			$\boxed{\sigma \sim 1/r}$	(6.36)

(6.36) means: elementary vortices are indestructible!

Fig. 6.19: Interpretation of the dependencies on radius

6.19 Interpretation of the transformation table

The transformation should tell us, what we would see if the variable speed of light would be observable to us. Doing so highly interesting results come out.
The energy density of a field is as is known $w = (\varepsilon \cdot E^2 + \mu \cdot H^2)/2$. (6.37)
In the observation domain will, according to fig. 6.19, decrease the energy density w proportional to $1/r^4$. Multiplied with the respective volume we obtain for the energy itself the proportionality: $W \sim 1/r$. (6.38)
If we make use of the Einstein relation $W = m \bullet c^2$
with c = constant holds also for the mass m: $m \sim 1/r$. (6.39)
In this manner we finally find out, why the small nucleons (protons and neutrons) subjectively seen are heavier than the very much larger electrons. As a consequence does a relativistic particle experience the increase of mass (with the length contraction according to equation 6.24*):

$$\frac{m}{m_0} \overset{(6.39)}{=} \frac{r_0}{r} \overset{(6.26)}{=} \frac{l_0}{l} \overset{(6.24^*)}{=} \frac{1}{\sqrt{1 - (v/c)^2}} \qquad (6.40)$$

This result is experimentally secured. Our considerations therefore are entirely in accord with the Lorentz-transformation. There at least is no reason to doubt the correctness.
In the model domain we with advantage assume a spherical symmetry. As easily can be shown with equations 6.4 and 6.31, are the capacity and charge of a spherical capacitor independent of the radius (6.30 and 6.32). In that case also the from both values calculable energy (6.1) must be constant. We come to the same conclusion, if take we the above equation 6.37 for the energy density of a field or if we carry out a verification of dimensions:
W [VAs] = konst. . (6.33)
This simple result is the physical basis for the law of conservation of energy! With that we have eliminated an axiom.
The result states that the energy stays the same, even if the radius, the distance or the speed of an object should change. To the subjectively observing person it shows itself merely in various forms of expression. Consequently is the energy, as is dictated by the here presented field theory, formed by binding in the inside of the quanta the same amount of energy but of the opposite sign. The amount of energy therefore is bound to the number of the present particles, as we already had derived.
Under the assumption of a constant time (6.35) there results for the electric conductivity σ, by calculating backwards over the equation of the relaxation time (5.3), the proportionality: (6.36)

$$\sigma\,[A/Vm] \sim 1/r \qquad (6.36)$$

Maybe the result surprises, because it can't be observed. Actually we know that the (microscopically observed conductivity in reality only represents an approximated averaged measure for the mobility of free charge carriers. In a particle-free vacuum however this well-known interpretation doesn't make sense anymore. Hence it is recommended, to only work with the relaxation time constants. Who nevertheless wants to eontinue to work with σ as a pure factor of description, can do this. But he mustn't be surprised, if in the model domain with decreasing radius the conductivity suddenly increases. But this is necessary, because otherwise the elementary particles would collapse. Only by the increase of the conductivity, which is produced by the spherical vortex itself, will the expanding eddy current build up in the inside of the particles, which counteract the from the outside concentrating potential vortex.

Approach:

a.The particles don't decay by themselves, but only by a corresponding disturbance from the outside.

b.The decay time is the statistical average in which such a disturbance can occur and take effect.

c.The elementary particles consist of an integral and finite number of elementary vortices, which can't decay anymore for their part.

d.If the compound particles get into the disturbing range of influence of high-frequency alternating fields, then they are stimulated to violent oscillations and in that way can be torn apart into individual parts.

e.As disturbing factor the high-frequency fields of flying past neutrinos are considered primarily.

f. Authoritative for the threshold of decay and with that also for the rate of decay is the distance, in which the neutrinos fly past the particle.

g.The distance becomes the larger, the smaller the particle is. If the particle thus experiences a relativistic length contraction, then it will, statistically seen, to the same extent become more stable!

That has nothing to do at all with time dilatationl

We are entitled to demand a simultaneity, after all we are the ones, who tell what that is!

Fig. 6.20: Proposal for an interpretation of the particle decay

<i>: Walter Theimer: Die Relativitatstheorie, Seite 106, Francke Verlag, Bern, 1977, ISBN 3-772O-126O-4

6.20 Particle decay

We still have to get rid of a fundamental misunderstanding. It concerns the problem of the time dilatation. Here the model domain doesn't give us any difficulty, because it dictates a constant and therefore by us definable time. In the relativistic view however should in moving systems clocks go wrong! But how does one want to explain a time dilatation physically, if it merely represents a purely mathematical result of the actually taking place length contraction on the one hand and the postulate of a constant speed of light on the other hand?

Nobody has troubled more about the physical interpretation than Einstein himself. But he had as less as we nowadays the possibility to verify the so-called phenomenon experimentally, by accelerating a laboratory clock to values close to the speed of light. Only atomic particles can, e.g. in accelerator systems, be brought on such high speeds and then be observed for their properties. But also these experiments don't have any power of proof, as long as we don't know the atomistic structure of the particles and there exists the danger of misinterpretations.

So the slowing down of the rate of decay of instable. particles at high speeds willingly is cited as "proof for time dilatation<1>. "The most cited example for the time dilatation is the "long-living" meson. The μ-meson is a charged particle, which exists only $2{,}2 * 10^{-6}$ seconds if it is observed in rest. Then it decays ... About 10 % of the mesons reach the earth's surface. Even if they fly with approximately the speed of light, they at least must have used $30 \bullet 2{,}2 * 10^{-6}$ seconds, in order to reach the earth. Their "life" therefore by the movement has been extended for a multiple... to the supporters of the theory of relativity here the time dilatation is revealed..."

This "proof however is worthless, as long as "the structure and the mechanism of decay of the particle are not known", like W. Theimer<1> expresses himself.

On the basis of the new field theory the approach standing on the left page is dared (fig. 6.20). Accordingly the particles don't decay by themselves, but only by a corresponding disturbance from the outside, which for instance is triggered by the high-frequency fields of flying past neutrinos. The closer the neutrinos fly past the particle, the sooner it will decay. But the distance becomes the larger, the smaller the particle is. If the particle thus experiences a relativistic length contraction, then it will, statistically seen, to the same extent become more stable!

That has nothing to do at all with time dilatation, as this proposal for an interpretation shows (fig. 6.20). The same effect of course also occurs, if atomic clocks are taken for a fly in a plane and compared to identically constructed clocks on earth.

The time was stipulated by us and therefore should be able to keep its universal validity. We are entitled to demand a simultaneity, after all we are the ones, who tell what simultaneity is!

An interesting technical use would be the acceleration of the rate of decay in order to dispose of radioactively contaminated waste. For that the waste has to be irradiated by collecting and focussing free neutrinos or with the help of a neutrino transmitter, like one which will be discussed in chapter 9. After such a neutrino shower dangerous radioactive waste would be reusable or at most be harmless domestic refuse.

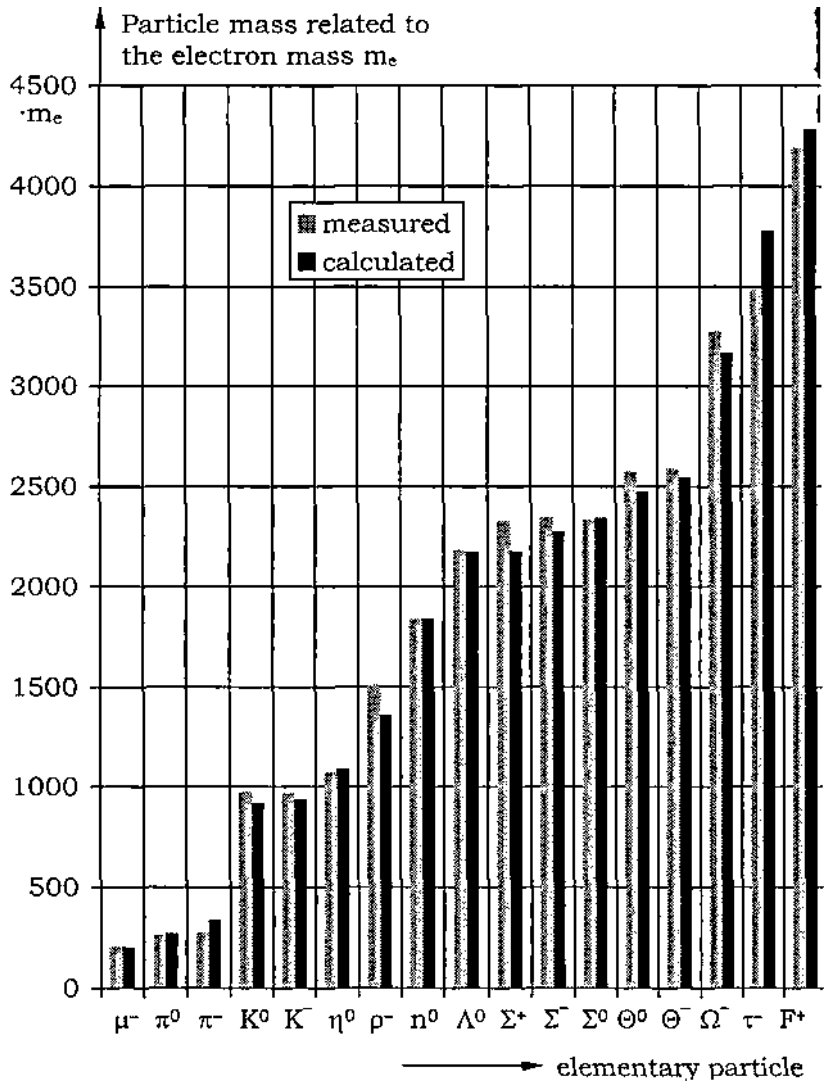


Fig. 7.0: The comparison with power of proof:
the measured particle mass
the calculated particle mass

7. Proof

Ample evidence is available for the correctness of the theory of objectivity. The field dependent change in length is observed and used as magnetostriction or electrostriction. If a ferromagnetic material, e.g. a nickel rod, is brought into an alternating magnetic field, then field dependent longitudinal length oscillations are observed. In the same manner barium titanate or quartz crystal oscillates in the electric field if a high-frequency alternating voltage is applied.
A practical application forms the production of ultrasound.

In this chapter are, as already announced, the quantum properties of the elementary particles calculated and in this way is furnished perhaps the most convincing proof for the existence of potential vortices and for the correctness of the field-theoretical approach and the theory which is based on it.
A special challenge represents the calculation of the particle mass. This mass stretches from 207 electron masses of the myon over 1839 of the neutron into the order of magnitude of 18513 electron masses (Y°). Doing so not only can be tested, if the calculated values correspond with the measured ones. Also the gaps have to correspond, i.e. where there doesn't exist a discrete mathematical solution also no particle should exist. The fig. 7.0 standing on the left page anticipates the result and shows that even this strict condition is fulfilled! The agreement of the calculated with the measured results is excellent. If in individual cases small deviations become visible, we always have to bear in mind that the measurements as a rule are analysed statistically and the results are falsified if small particles creep in unrecognized. Particle physics nowadays has at its disposal extremely precise gauges, but even here remaining errors can't be excluded.

Quantum physics is occupied with further taking apart the elementary particles into hypothetic particles, the quarks, and to sort these according to properties and symmetries. Seen strictly causal this procedure thus corresponds to the quantum physical approach. We however have taken the field-theoretical approach, and this excludes the introduction of hypothetic particles from the start. It should be our goal to derive and to explain the quantum structure as a field property. Yes, we even want to calculate it, with which we would have overtaken quantum physics in the scientific competition with one leap!

Strong support our approach has experienced by current experiments, in which matter was transformed in electromagnetic waves - practically the reversal of the rolling up of waves to vortices. To do so at the Massachusetts Institute of Technology (David Pritchard and others) sodium atoms were dematerialized in waves by lattice scattering<i>. According to Einstein one surely could have blown the whole M.I.T. in the air with the occurring mass defect; but don't worry, no emission of energy whatsoever has been observed, entirely as predicted by the vortex theory.

<i>: J. Teuber: Materie und Energie, Ganze Atome wurden zu Energiewellen,
Illustrierte Wissenschaft Nr. 7 (1996), S. 56

With the classical radius of the electron $r_e = 2{,}82 * 10^{-15}$ m:

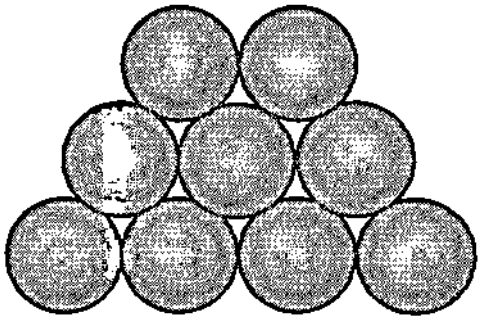
$$C_e = \varepsilon_o \cdot 4\pi r_e = 3{,}135 \cdot 10^{-25}\text{F} \qquad (6.4^*)$$

$$U_e = e/C_e = 511\text{kV} \qquad (6.31^*)$$

(constant independent of r_e)

Formation forms (vortex properties):

I. Amassing (formation of vortex balls):



II. Overlapping (phenomenon of transport)

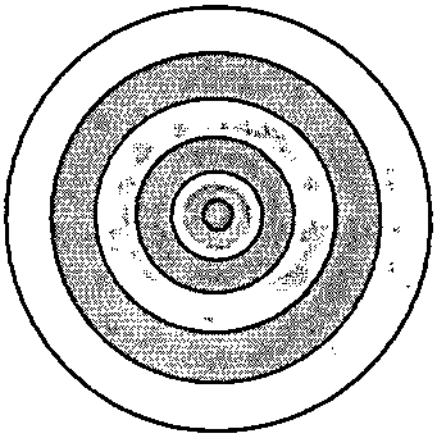


Fig. 7.1: The amassing and overlapping of elementary vortices

7.1 Elementary vortices

We had derived the electron and the positron as elementary vortices (fig. 4.3). Before we can go in the calculation, we must gain a clear picture of the possible configurations of vortices, which for reason of the derived properties are possible. For that we start with the elementary vortex and afterwards we predict the behaviour of interaction which can be expected.

Actually only one single particle is really elementary. According to the realizations of the new theory it is an elementary vortex in the form of a sphere. Its size is determined by the speed of light and this again by the local field strength; its stability is founded in the concentration effect of the potential vortex. The whirling takes place everywhere with the speed of light, even in the vortex centre, where all field lines run together, where the field increases infinitely and the speed of light goes to zero. This last circumstance owes the elementary vortex its localization.

We can attribute a charge to this vortex for reason of the field lines which on the outside run towards infinity and which we can measure (fig. 4.3). This is the smallest indivisible unit, the elementary charge e. Structure and course of the field lines suggest to understand and to calculate the elementary vortex as a spherical capacitor. By basing on the classical radius of the electron r_e given in fig. 6.3 the capacity according to equation 6.4 is calculated to be:

$$C_e = \varepsilon_0 \cdot 4\pi r_e = 3{,}135 \cdot 10^{-25}\ \mathrm{F} \quad (6.4^*)$$

Here the theory of objectivity has provided us the realization that even for a change of the radius of the electron the capacity remains unchanged constant (6.30), and this entirely corresponds to our observation.

Between the hull of the elementary vortex, measured at the radius r_e, and its centre, respectively also with regard to infinity, there exists according to equation 6.31 the tension voltage of:

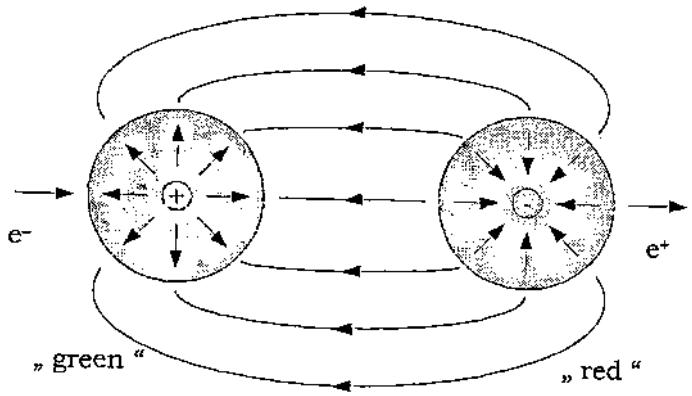
$$U_e = e/C_e = 511\ \mathrm{kV} \quad (6.31^*)$$

It as well is constant and independent of the size of the elementary vortex.

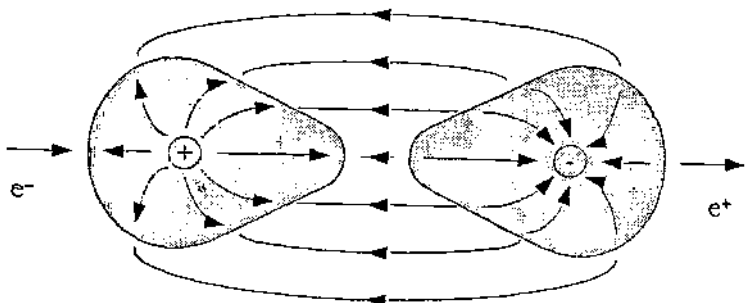
Since a different solution is refused, we'll have to assume that all elementary particles consist of an integer multiple of elementary vortices. For that the amassing, like closely packed tennis balls, or the overlapping of individual vortices in the form of shells, like in the case of an onion (phenomenon of transport) can be considered.

The among each other occurring forces of attraction can be traced back to the fact that every elementary vortex is compressed by the field of its neighbour as a consequence of the field dependent speed of light. This field as a rule is for the small distances considerably larger than the field on the outside. Therefore do compound elementary particles not have the twofold or triple mass, but at once the 207-fold (myon) or the 1836-fold (proton) mass. After all there is no other explanation for the fact that there don't exist lighter particles (with a mass less than 207 electron masses)!

a. The electron-positron pair



b. . The e^- - e+ pair for a small distance:



7.2 Matter and anti-matter

For the amassing or overlapping of elementary vortices several cases must be distinguished, because two inverse forms of formation are possible for the elementary vortex: the negatively charged electron and the positively charged positron. Whereas in the case of the electron the vortex produces a component of the electric field which points from the inside to the outside, has the field in the case of the positron the opposite direction for reason of a reversed swirl direction.

This statement can be generalized: if we consider the elementary particles from the outside, then we assign the particles with a swirl direction identical to that of the electron to the world of matter and call the particles with the opposite swirl direction anti-matter. It now is strongly recommended, to take colours to hand, in order to optically clarify the properties of vortices. The electron will be marked as a green sphere and the antiparticle, the positron, as a red sphere.

If we now look into the world of matter, then appears our world of matter to us "green", the world of anti-matter however "red". The uniform green colour of all the in our world existing elementary particles however doesn't exclude that red anti-vortices can exist hidden in the inside of the green vortices, where we can't discover them. But they must be completely covered, otherwise a disastrous reaction occurs, the pair annihilation, as a consequence of the oppositely directed property of the vortices which cancel out. By means of the pair annihilation a dematerialization can occur, because every elementary vortex keeps in its inside the same amount of energy with opposite sign and the fusion of two inverse particles can result in a zero sum of the energy. The best known example is the annihilation of an electron-positron pair under emission of radiation discovered by Klemperer in 1934. In the upper representation (fig. 7.2a) the elementary vortices still are symmetrical, but the outside field lines already are "bent" and linked together in such a way that, with the exception of the ones in the direction of the axis, no interaction takes place which can be measured.

The two particles for reason of the different charge approach each other quickly, and the closer they are, the larger the mutual force of attraction becomes; a vicious circle, which leads to the asymmetry shown in the lower sketch (fig. 7.2b) and only comes to rest, if both particles have destroyed themselves mutually.

The electron and the positron had the same amount of, but oppositely directed swirl activity, so that purely arithmetically seen a zero sum of the rest energy results. But it should be paid attention to both particles having some kinetic energy on the occasion of the relative motion to each other and if they rotate around their own axis also rotational energy. An emission of annihilation radiation occurs, is the explanation of particle physics.

With the knowledge of the photon (fig. 4.6) we can interpret the annihilation radiation as a consequence of the phenomenon of transport. The faster and consequently smaller vortex, for instance the green one, slips into the red one and sees the green inside, which is compatible for it. Unfortunately it only can remain there, as long as it is smaller, thus is faster, and therefore it shoots out on the other side again. Now the electromagnetic force of attraction fully takes effect. It is slowed down and the red vortex correspondingly accelerates. The process is reversed.

These around each other oscillating vortices, so we had derived, have a characteristic frequency (colour), are polarizable and are moving forward with the speed of light as a consequence of the open vortex centre. It therefore concerns the photon.

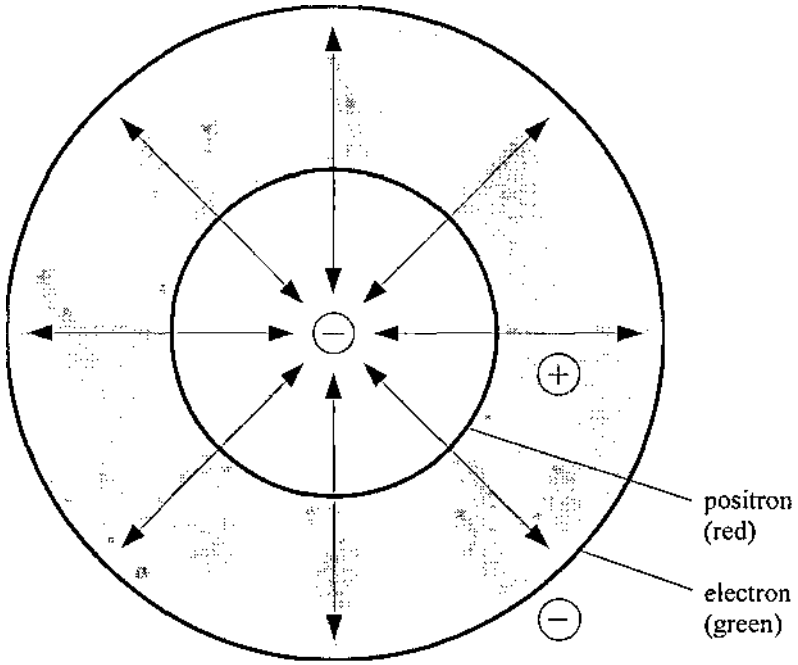


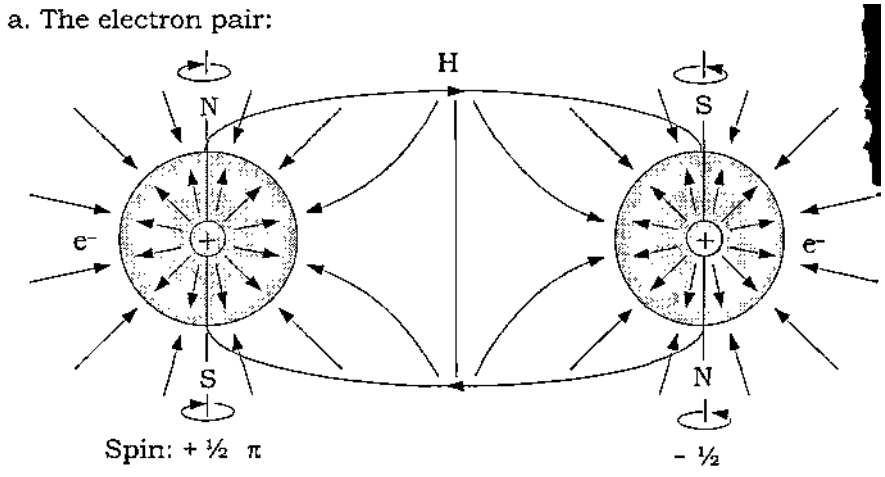
Fig. 7.3: Theoretical final state of the positronium = static γ-quant (photon).

7.3 Positronium

But before the two elementary vortices, the electron and the positron, are annihilated under emission of radiation, they will for a short time take a shell-shaped, a bound state, in which one vortex overlaps the other.
Its formation we can imagine as follows: an electron, flying past a resting positron, is cached by this for reason of the electromagnetic attraction and spirals on an elliptic path towards the positron. In doing so its angular velocity increases considerably. It will be pulled apart to a flat disc for reason of the high centrifugal forces, to eventually lay itself around the positron as a closed shell.
Now the red positron sees the electron vortex so to speak "from the inside" and doing so it sees as well red; because the green vortex has a red centre and vice versa! The result is the in fig. 7.3 given configuration.

The number of field lines, which run from the red border of the positron in the direction of the centre, is identical to the number, which point towards the green border of the electron. Here already the same state has been reached as in the centre, which corresponds to the state at infinity. That means that no field lines point from the green border to the outside; seen from the outside the particle behaves electrically neutral. It doesn't show any electromagnetic interaction with its surroundings.

If the particle were long-living, then it undoubtedly would be the lightest elementary particle besides the electron; but without stabilizing influence from the outside the positronium can't take the in fig. 7.3 shown state at all. The positron takes up the kinetic energy which is released if the electron becomes a shell around it. But before the bound state can arise, which would identify the positronium as an elementary particle, the equal rights of both vortices comes to light. With the same right, with which the electron wants to overlap the positron, it itself vice versa could also be overlapped.
If the stabilization of the one or the other state from the outside doesn't occur, then the stated annihilation under emission of y-quanta is the unavoidable consequence (fig. 4.6).



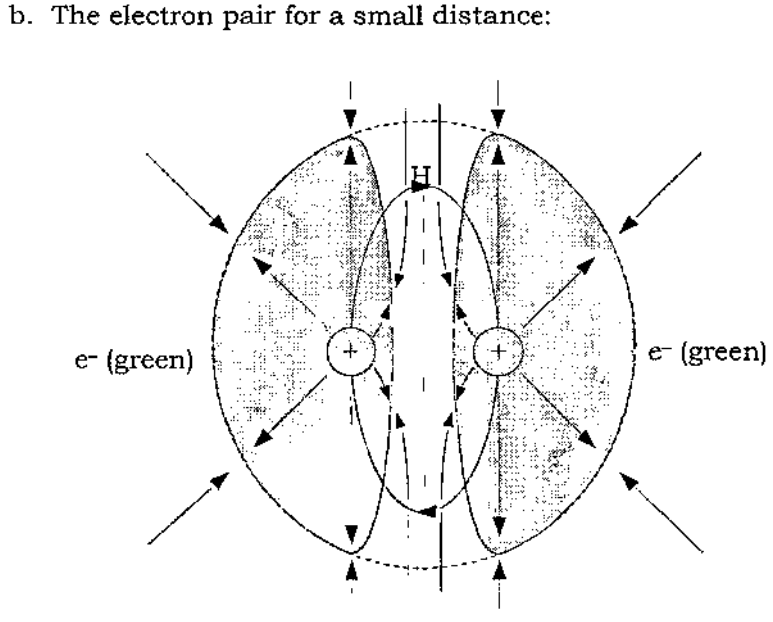


Fig. 7.4: Two electrons with oppositely directed spin

7.4 Dipole moment

As electrically charged spheres elementary vortices have a magnetic dipole moment along their axis of rotation as a consequence of the rotation of their own (fig. 7.4). This is measurable very precisely and for the most important elementary particles also known quantitatively. In contrast to the angular momentum the magnetic moment can't be constant according to the here presented theory. It should slightly change, if we increase the field strength in the laboratory.

In a particle consisting of several elementary vortices the vortices mutually increase the local field strength. Therefore we measure at the proton, which consists of three vortices, not the triple, but only the 2,793-fold of the nuclear magneton which can be expected for reason of its mass. Also the neutron has instead of the double only the 1,913-fold nuclear magneton. The deviations therefore are explicable as a consequence of the surrounding fields.

Prerequisite for this point are two other, still unanswered, key questions of quantum physics:

> XII: Why is measured for the proton approximately the triple of the magnetic dipole moment which can be expected for reason of the charge?
>
> XIII: Why does the neutron, as an uncharged particle, actually have a magnetic moment?

These questions can only be brought to a conclusive answer, if we have derived the vortex structures of the respective particles.

The elementary vortex, as a consequence of the spin along its axis, forms a magnetic north pole and a south pole. Another possibility to interact with an external field or with other particles is founded on this property. This shall be studied by means of two electrons. which form an electron pair.
For reason of the equal charge the two electrons at first will repel each other. If they rotate of their own they however will mutually contract, which, seen from the outside, is interpreted as a force of attraction. And in addition will they align their axes of rotation antiparallelly. While they now rotate in the opposite direction, a magnetic force of attraction occurs.

As is shown in fig. 7.4, the magnetic dipole field in this way is compensated towards the outside, as is clarified by the field line (H) with a closed course. Between both electrons a space free of E-field stretches. If both vortices are a small distance apart they lay themselves around this space like two half-shells of a sphere. A particle forms which seen from the outside is magnetically neutral, but it carries the double elementary charge (fig. 7.4b).
The exceptional affinity is always restricted to two vortices of equal charge with an opposite direction of rotation. Further vortices can't be integrated anymore and are repelled. This property of vortices covers the quantum condition (Pauli's exclusion principle) for the spin quantum number perfectly.

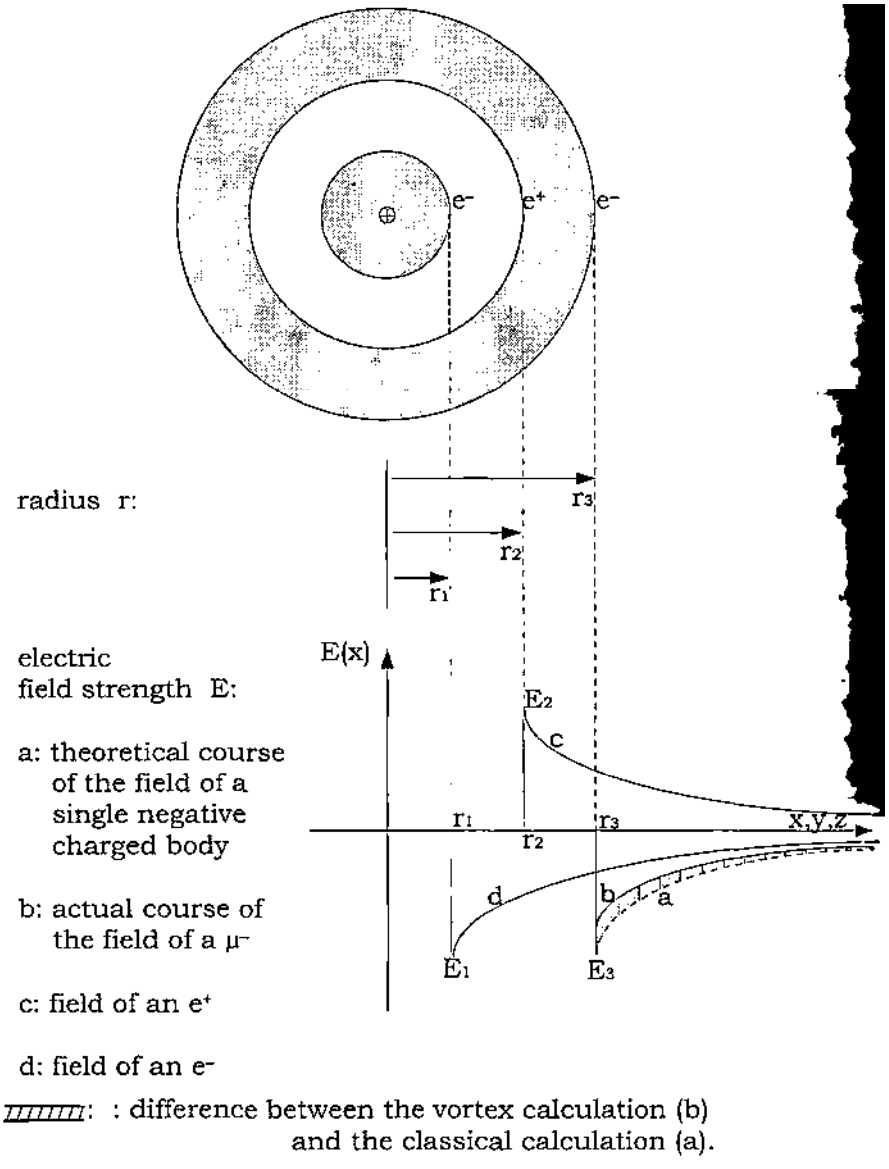


Fig. 7.5: The mvon and the electric field E(x) of the three elementary vortices

7.5 Myon

We now have discussed all conceivable possibilities, which two elementary vortices can form: the creation of a pair for like charge and the annihilation under emission of photons via the formation of the positronium as an intermediate result for unequal charge. Next another elementary vortex shall be added and all different possibilities and configurations will be derived, which can be formed by amassing or overlapping.

The positronium can, as said, only take the in fig. 7.3 shown bound structure, if it is stabilized from the outside. This task now a further electron shall take over. According to the shell model the innermost elementary vortex an electron (e^-), is overlapped by a positron (e^+) and that again overlapped by an electron (e^-).
With an in the sum single negative charge, a completely symmetric structure as well as a half-integer spin this particle will show a behaviour corresponding to a large extent to that of the electron. Merely the mass will be considerably larger, because every vortex each time compresses the other two.

It therefore concerns the myon (μ^-), which also is called "heavy electron". The myon was discovered 1937 in the cosmic radiation (Anderson and others).
In fig. 7.5 are drawn above each other the shell-shaped structure of the myon and the electric field E(x) of the three elementary vortices.
It is visible that merely in the proximity of the particle the actual course of the field deviates from and is smaller, than the course which theoretically can be expected for a single negatively charged body. The difference is marked by a hatching.

We now can tackle the calculation of the myon. For that the following considerations to begin with are useful:
Mass is an auxiliary term founded in usefulness, which describes the influence of the electromagnetic field on the speed of light and with that on the spatial extension of the "point mass".
Without exception the local cosmic field E_o has an effect on a free and unbound elementary vortex, thus on an individual e^- or e^+, and determines so its size and its mass.
But as long as we haven't determined this field strength, the calculation of its quantum properties won't succeed.
Instead the masses of compound particles will be compared to each other, which are so heavy that the field strength of the neighbouring vortices is predominant over the basic field E_0, so that a neglect of E_o seems to be allowed. The course of the calculation is made for all elementary particles in the same manner, which is explained hereafter.

Spherical capacitor: (r_i = inner radius; r_a = outer radius)

$$U = \int_{r_i}^{r_a} E \, dr \qquad (7.1)$$

Electron ($r_i = 0$ and $r_a = r_e$): $U = 511$ kV = const. (6.31*)

$$U_1 = U_2 = U_3 = U_4 = \ldots = U_n \qquad (7.2)$$

At The radius r_1 is valid: $E(r_1) = E_1$ and

$$U_1 = \int_0^{r_1} E_1 \, dr = E_1 r_1 = U_2 = \int_{r_1}^{r_2} E_1 \, dr = E_1 (r_2 - r_1) \qquad (7.1^*)$$

At the radius r_2 is valid for the 2nd and 3rd shell $E(r_2) = E_2$:

$$U_2 = \int_{r_1}^{r_2} E_2 \, dr = E_2 (r_2 - r_1) = U_3 = \int_{r_2}^{r_3} E_2 \, dr = E_2 (r_3 - r_2) \qquad (7.1^{**})$$

comparison of the radii:

$$\Delta r = r_1 \overset{(7.1^*)}{=} r_2 - r_1 \overset{(7.1^{**})}{=} r_3 - r_2 = \ldots = r_n - r_{n-1} \qquad (7.3)$$

resp.:

$$r_2 = 2 \cdot r_1; \quad r_3 = 3 \cdot r_1; \quad \ldots; \quad \boxed{r_n = n \cdot r_1} \qquad (7.4)$$

comparison of the field strengths: (7.1* with 7.1** with Eq. (7.2):

$$E_1 = E_2 = E_3 = \ldots = E_n \qquad (7.5)$$

Theory of objectivity, fig. 6.18: $\boxed{E \sim 1/r}$ (6.25)

see fig. 7.5:

$E_1(r_3) = E_{31} = -E_1 \cdot (r_1/r_3)$
$E_2(r_3) = E_{32} = E_2 \cdot (r_2/r_3)$
E_0 = cosmic basic field (negligible)

$$E(r_3) = E_{31} + E_{32} + E_0 = E_1 \cdot (r_2 - r_1)/r_3 + E_0 \qquad (7.6)$$

$$\boxed{\frac{E(r_3)}{E_1} = \frac{2 \cdot r_1 - r_1}{3 \cdot r_1} = \frac{1}{3}} \qquad (7.7)$$

Fig. 7.6: Calculation of the electric field strength E(r) of the myon from its dependency on radius

7.6 Calculation of the vortex fields

The tension voltage of an elementary vortex, like for a spherical capacitor, is determined by integrating over the electric field strength from the inner radius r_i up to the outer radius r_a:

$$U = \int_{r_i}^{r_a} E \, dr \quad (7.1)$$

For the electron ($r_i = 0$ und $r_a = r_e$) we already have carried out the integration and determined the tension voltage to be 511 kV (equation 6.31 *).
Doing so we further had discovered that it won't change, if the radius r varies. Even for a shell configuration, in which electrons and positrons alternately overlap, the approach is valid:

$$U_1 = U_2 = U_3 = U_4 = \ldots = U_n \quad (7.2)$$

At a certain radius all elementary vortices show the same density of field lines and with that also the identical field strength, so that we can solve the integral (7.1) for the each time neighbouring vortex shells and can compare the results:
At the radius r_1 with $E(r_1) = E_1$ the agreement, according to equation 7.1* (fig. 7.6), is valid for the innermost and the overlapped vortex shell.
At the radius r_2 with $E(r_2) = E_2$ the agreement according to equation 7.1** (fig. 7.6) is valid analogously for the 2nd and 3rd shell.
If still more shells are present, then we can arbitrarily repeat this procedure. For the radius of each shell we always obtain relation 7.3, which, related to the innermost radius, provides the following simple expression for the individual radii:

$$r_2 = 2 * r_1 ; \qquad r_3 = 3 \bullet r_1; \qquad \ldots ; \qquad r_n = n * r_1 \quad (7.4)$$

From the comparison of the integration results 7.1* and 7.1** follows further that all elementary vortices produce the same field strength:

$$E_1 = E_2 = E_3 = \ldots = E_n \quad (7.5)$$

We infer from the transformation table (fig. 6.18, eq. 6.27) that the field strengths E and H decrease with 1/r. In fig. 7.5 the decrease of the fields with 1/r is shown. Up to the radius r, the field of the innermost vortex E_1 has worn off to the value $E_{31} = - E_1 \bullet (r_1/r_3)$. This field is overlapped by $E_{32} = E_2 * (r_2/r_3)$ as well as the cosmic basic field E_o:

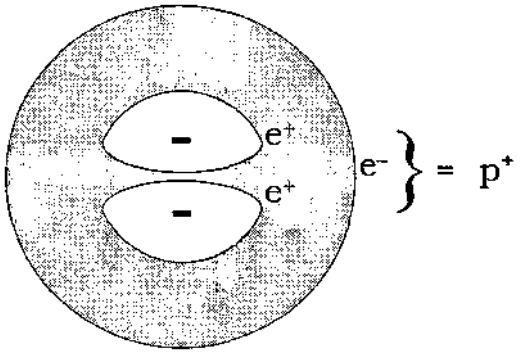
$$E(r_3) = E_{31} + E_{32} + E_0 = E_1 \bullet (r_2 - r_1)/r_3 + E_o \quad (7.6)$$

The local basic field E_o is not known, but it is very small with regard to the field of the neighbouring vortex shells, so that a neglect seems to be allowed. From equation (7.6) in this way follows with the radius relation (7.4):

$$\frac{E(r_3)}{E_1} = \frac{2 \cdot r_1 - r_1}{3 \cdot r_1} = \frac{1}{3} \quad (7.7)$$

For the shell-shaped configuration of the myon (fig. 7.5) relation (7.7) indicates, which field the outside vortex shell is exposed to. From this can already be seen, how much it is compressed thanks to the field dependent speed of light and how much its mass as a consequence is increased.

Structure of the proton p^+:



Calculation:
structure consisting of two shells, inner vortices with $2 \bullet E_1$,
field strength at the outer radius r_2:

$$E(r_2) = 2 * E_{21} = 2 * E_1(r_1/r_2) = E_1 \qquad (7.8)$$

Comparison of p^+ (7.8) with u^- (7.7) (z_e = number of the elementary vortices being involved with) in building up the structure, here each time $z_e = 3$):

Comparison of the radii with $E \sim 1/r$ (6.27)

$$\frac{r_p}{r_\mu} = \frac{z_{e\mu}}{z_{ep}} \cdot \frac{E_\mu(r_3)}{E_p(r_2)} = \frac{3}{3} \cdot \frac{1/3}{1} = \frac{1}{3} \qquad (7.9)$$

Theory of objectivity (fig. 6.18): $m \sim 1/r^2$ (6.34)

$$\frac{m_p}{m_\mu} = \frac{z_{ep}}{z_{e\mu}} \cdot \left(\frac{r_\mu}{r_p}\right)^2 = \frac{3}{3} \cdot \left(\frac{3}{1}\right)^2 = 9 \qquad (7.10)$$

$$m_p/m_e = 9 * (m_u/m_e) = 9 * 207 = 1863 \qquad (7.11)$$

Measurement value, proton mass: $m_p = 1836 \bullet m_e$
Resp.:
measurement value myon mass $m_u = 207 * m_e$
myon calculated value: $m_p = 204 * m_e$. (error = 1,5%)

Since we, by using this calculation method, for the first time succeeded in deriving the mass of an elementary particle from that of another particle, the particle mass isn't a constant of nature anymore!

Fig. 7.7: Calculation of the proton

7.7 Calculation of the proton

If we again remember the affinity of two elementary vortices, which rotate with opposite spin. They align their axis of rotation antiparallel and form a very probable, but not particularly tight bound pair (fig. 7.4).
If we this time start with a positron pair, then does this pair have a double positive elementary charge. The two e^+ hence exert a particularly big force of attraction on electrons flying past them. If they have cached one and put it round as a shell, like a coat, then they will never again give it back! To again remove the electron, a triple positive charge would be necessary. But such a particle can't exist at all. The new particle therefore has an absolute stability and a very big mass, because the positron pair is considerably compressed by its outer shell. The total charge is single positive. With these properties it actually only can concern the proton. Its structure is shown in fig. 7.7.
We can start from the assumption that both positrons are very close together in the inside and thus each forms the half of a sphere. For the calculation of the proton mass we then can assume as an approximation a structure of two shells, in which the inner vortex will have the double charge and the double field (2 * E_1). With equation 7.4 the field strength at the outer radius r_2 is:

$$E(r_2) = 2*E_{21} = 2*E_1*(r_1/r_2) = E_1 \qquad (7.8)$$

If we want to compare the results of the p^+ (7.8) and the μ^- (7.7), then it should be considered that the field of the innermost elementary vortex E_1 only is equal, if the number z_e of the elementary vortices involved in building up the particle is identical. Here with each time $z_e = 3$ this is the case. Because of equation 6.27 (E, H ~ 1/r) now also the radii are comparable:

$$\frac{r_p}{r_\mu} = \frac{z_{e\mu}}{z_{ep}} \cdot \frac{E_\mu(r_3)}{E_p(r_2)} = \frac{3}{3} \cdot \frac{1/3}{1} = \frac{1}{3} \qquad (7.9)$$

The mass of a particle first is determined by the number of the elementary vortices z_e. According to the theory of objectivity (fig. 6.18) however also the radius has an influence on the mass: $m \sim 1/r^2$ (6.34)

This proportionality should be applied to the p^+-μ^-- comparison.

$$\frac{m_p}{m_\mu} = \frac{z_{ep}}{z_{e\mu}} \cdot \left(\frac{r_\mu}{r_p}\right)^2 = \frac{3}{3} \cdot \left(\frac{3}{1}\right)^2 = 9 \qquad (7.10)$$

The calculation provides a nine times bigger mass for the proton with regard to the mass of the myon. Therefore the mass of the proton related to the mass of the electron is:

$$m_p/m_e = 9*(m_\mu/m_e) = 9*207 = 1863 \qquad (7.11)$$

It would be favourable, to start from the with measuring techniques determined value for the mass of the proton $m_p/m_e = 1836$ and calculate backwards the related mass of the myon.
Then we obtain 204 as the calculated value instead of the measurement value m_μ/m_e= 207.
The reason for the deviation of 1.5 percent is caused by the neglect of the cosmic field E_o with regard to the field of the neighbouring elementary vortex. This neglect takes very much less effect for the relatively heavy proton than for the light myon.
The cosmic field therefore will compress the myon more strongly and increase the mass more strongly as is calculated here, in agreement with the measurement results.
Summarizing: since we, by using this calculation method, for the first time succeeded in deriving the mass of an elementary particle from that of another particle, the particle mass isn't a constant of nature anymore!

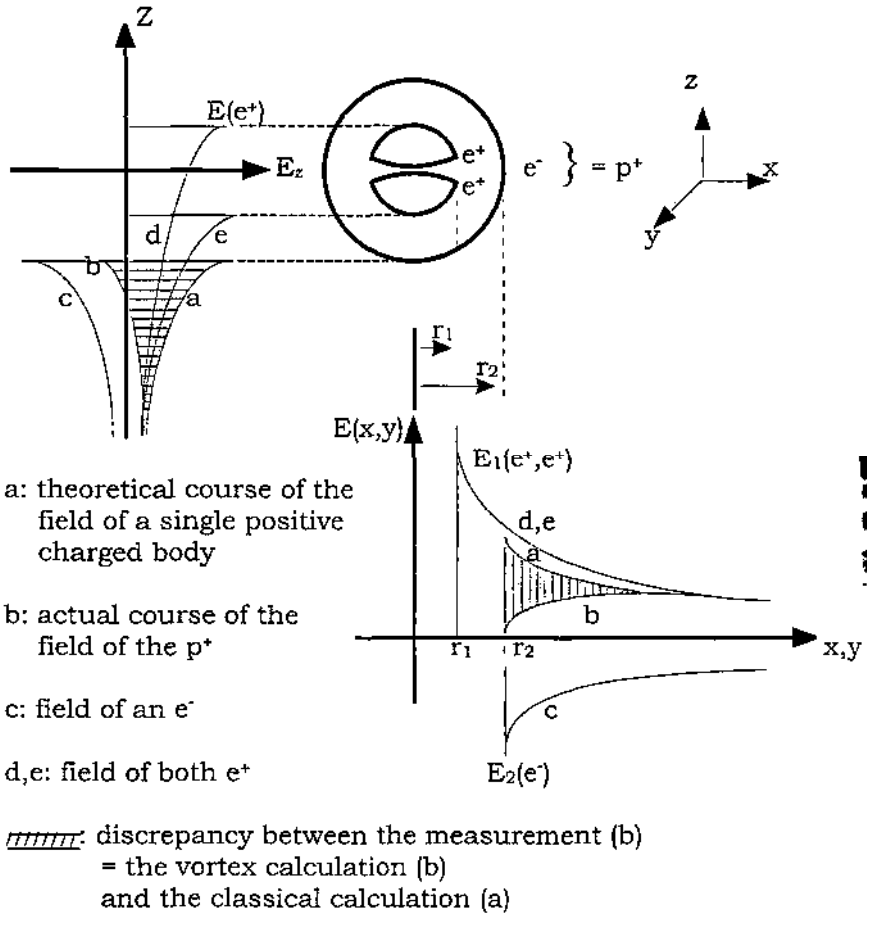


Fig. 7.8: The proton and the electric field of the three elementary vortices in x-, y- and z-direction

7.8 "Strong interaction"

A central question of nuclear physics concerns the forces which keep the atomic nucleus, which consists of many neutrons and protons, together and give it its very good stability in spite of the like positive charge (key question XIV fig. 7.13).
According to today's textbook opinion (course of the field indicated with a in fig. 7.8) the forces of repulsion between the individual protons increase further as the distance gets smaller, to obtain immense values within the nucleus. They theoretically had to be overcome by new and unknown nuclear forces. Therefore physicists assume the hypothesis of a "strong interaction". But they are mistaken.
The answer to this open question is provided by the course of the field (b) for the proton, sketched in fig. 7.8. We see that the electric field at first indeed still increases if we approach the proton, but in the proximity it contrary to all expectations decreases again until it is zero. With that then also any force of repulsion has vanished! But the course of the field follows without compulsion from the overlap of the three individual elementary vortex fields.
The field direction in the z-direction even is reversed! In this topsy-turvy world, in theory, an electromagnetic force of attraction between two like charged protons can occur. We conclude:
A strong interaction doesn't exist at all. The usually given values for "range" and "strength" just represent a misinterpretation. The hatched drawn area marks the difference which is misinterpreted by quantum physics. The model concept over and above that answers another mysterious property of the proton. As an electrically charged particle with a spin it first of all should form a magnetic moment for reason of the rotating charge. But until now the measurable order of magnitude couldn't be explained.

7.9 Magnetic moment of the proton

If the inner positrons rotate around each other with oppositely pointing spin, then the magnetic field line is already closed within the particle and no effect in x- or y-direction is observable from the outside.
As pair they however still can rotate together around the z-axis and they'll do that. The overlapping electron for reason of its rotation of its own will likewise build up a magnetic dipole moment along its axis of rotation. It also will align its axis in the z-direction, so that now all three elementary vortices have one field axis. Being comparable to individually "elementary magnets" aligned in the same direction they produce a triple magnetic moment (key question XII fig. 7.13).
If we namely would start with a single positively charged body according to the theory of quantum mechanics, then we would have expected the value of the nuclear magneton<i> p_m as the magnetic moment for the proton $p_m = e \cdot \hbar/2m$. Opposite to that provide experiments with protons the approx. threefold value as already predictable by the new vortex theory. In addition does the direction of the vector p_{mp} correspond with the spin-axis, so as if the proton were negatively charged. The reason for that is that only the outermost elementary vortex determines the spin of the particle, and that is actually a negatively charged electron! Also this excellent agreement in the case of the proton can be judged as proof for the correctness of the vortex model.

<i>: The nuclear magneton has the value of: $p_{mk} = 5{,}0508 \cdot 10^{-27}\ Am^2$

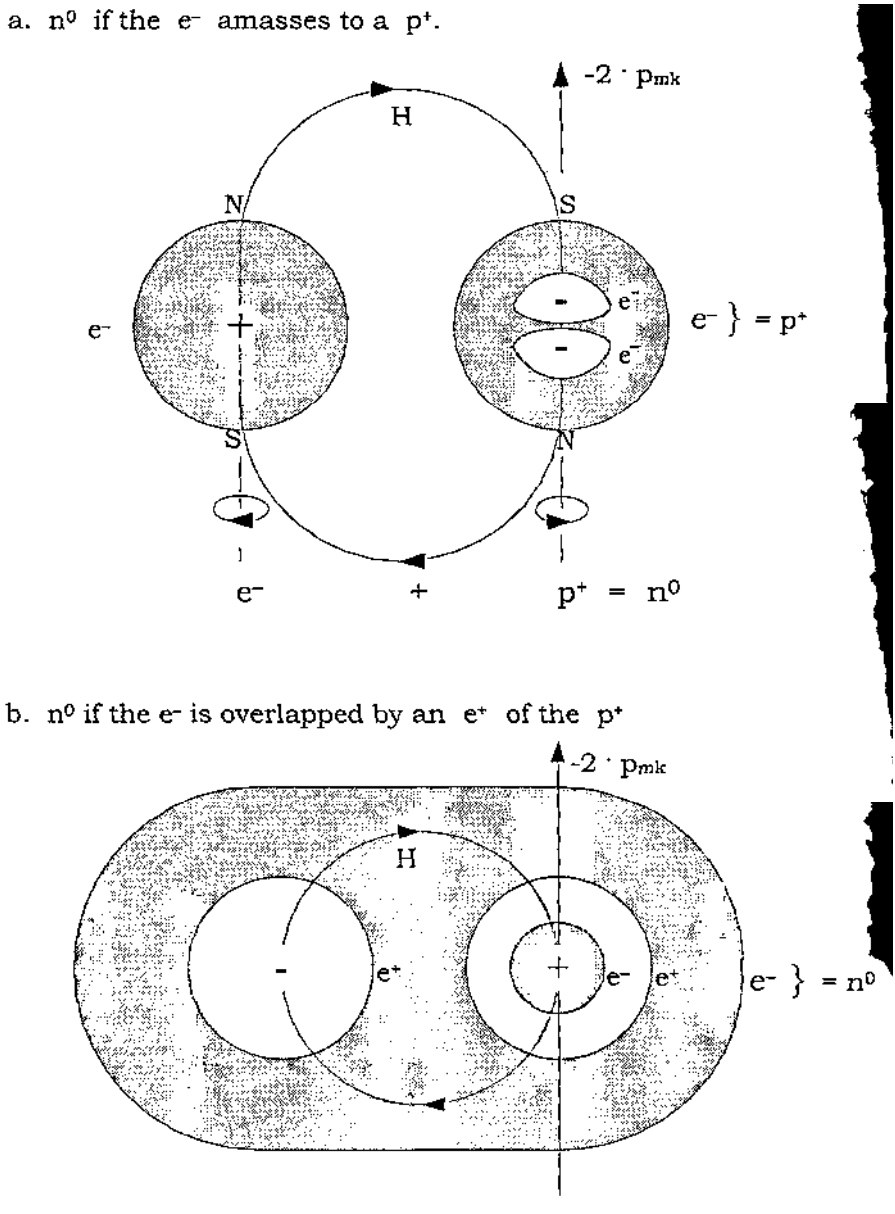


Fig. 7.10: The neutron with magnetic dipole field H

7.10 Structure of the neutron

Until now could not be solved, why despite its missing charge also the neutron n° has a magnetic moment. The experimentally determined value is approx. the double of the nuclear magneton. Further was with measuring techniques an only 0,14% bigger mass with regard to the proton determined. The difference is approximately two and a half electron masses. And how reads the answer in the view of the potential vortex theory? It is obvious that a positively charged proton and a negatively charged electron mutually attract and amass together (fig. 7.10a). A pair annihilation can't occur, because the electron, which jackets both positrons, prevents this. The formation of an outer shell is not permitted by the high stability of the proton. It would have to be a positron shell, which instead of neutrality would produce a double positive charge. Conceivable is however the configuration, in which one of the two e^+ of the proton takes up the e^- in its inside and overlaps it (fig. 7.10b).

At first appears the amassing of p^+ and e^- to be the obvious answer to the structure of the neutron also in view of the small increase in mass. Since both elementary particles (p^+ and e^-) have a spin, will they align their axes of rotation antiparallelly and rotate against one another, exactly like an electron pair. But we now have unequal conditions: the proton brings the triple magnetic moment, the electron however only the single, and its field line will be closed by the proton. The difference which remains is the measurable double nuclear magneton, with which key question XIII (fig. 7.13) would be answered exhaustively.

This structure is shown in fig. 7.10a and has as rest mass the by only one electron mass increased proton mass, but it will deviate from this value, when the unequal partner come closer. Doing so the electron will be more strongly compressed by the heavier proton as vice versa.

Mass, magnetic moment and charge thus correspond to a large extent with the measurement values. Problems are seen concerning the spin and the stability.

Set of problems concerning spin: both the e^- and the p^+ have a half-integer spin, for which reason this configuration should have an integer spin.

Set of problems concerning stability: the neutron decays as is well-known in a p^+ and an e^- , but this object should be shorter-lived as determined by experiments. If namely the partner come each other very close, then the field strength of the p^+, contrary to expectation, doesn't increase but decreases, as is shown in fig. 7.8. The e^- therefore can only be bound very, very loosely; in z-direction it even will be repelled!

For these reasons is the open structure, which is shown in fig. 7.10a, not feasible as an isolated elementary particle, but only in a spatially extended network, like it is present in an atomic nucleus. In this case the neutron is, as is well-known, lighter by the mass defect, which is interpreted as binding energy.

Possibly it only concerns an intermediate stage. The heavier final product of the n° then could look like is shown in fig. 7.10b. For this version the line of the magnetic field already is closed partly within the particle, so that also here the approx. double nuclear magneton remains as a rest with a sense of orientation, as if the neutron were negatively charged.

Without charge and with the 1/2 spin it in this configuration fulfils all important quantum properties of the neutron, even that of the stability.

the field of the e^-: $E_{31}(-) = - E_1 (r_1/r_3)$,

the field of the e^+: $E_{32} = E_2 (r_2/r_3) = E_1 (r_2/r_3)$

and in addition the e^+: $E_{3\,1} = E_1 (r_1/r_3)$.

$$E(r_3) = E_{31}(-) + E_{32} + E_{31} + E_0$$

E_0 negligible

With the radius relation (eq. 7.4): $r_2 = 2*r_1$ und $r_3 = 3* r_1$
The total field is:

$$\frac{E(r_3)}{E_1} = -\frac{r_1}{r_3} + \frac{r_2}{r_3} + \frac{r_1}{r_3} = -\frac{1}{3} + \frac{2}{3} + \frac{1}{3} = \frac{2}{3} \quad (7.12)$$

With $z_{en} = 4$ elementary vortices

$$\frac{r_n}{r_p} = \frac{z_{ep}}{z_{en}} \cdot \frac{E_p(r_2)}{E_n(r_3)} = \frac{3}{4} \cdot \frac{1}{2/3} = \frac{9}{8} = 1{,}125 \quad (7.13)$$

n_0 is 12,5% bigger than p±

$$\frac{m_n}{m_p} = \frac{z_{en}}{z_{ep}} \cdot \left(\frac{r_p}{r_n}\right)^2 = \frac{4}{3} \cdot \left(\frac{8}{9}\right)^2 = 1{,}05 \quad (7.14)$$

n^0 is 5% heavier than p±

Fig. 7.11: Calculation of the mass of the neutron

7.11 Calculation of the neutron

The calculation of the mass for the structure of the neutron according to fig. 7.10b has still remained open.

Because in this book for the first time has been shown, how the mass can be calculated, if the particles are understood as potential vortices, we also in this case again want to make use of this possibility.
We have, like for the μ^-, a structure of three shells with the radii r_1, r_2 and r_3. At the outer radius r_3 the fields of the elementary vortices on the inside have an effect on the electron On the outside: like is the case for the μ^-

the field of the e^-: $E_{31}^{(-)} = -E_1(r_1/r_3)$,

the field of the e^+: $E_{32} = E_2 (r_2/r_3) = E_1 (r_2/r_3)$

and in addition the e^+: $E_{31} = E_1 (r_1/r_3)$.

The total field is, with the radius relation equation 7.4:

$$\frac{E(r_3)}{E_1} = -\frac{r_1}{r_3} + \frac{r_2}{r_3} + \frac{r_1}{r_3} = -\frac{1}{3} + \frac{2}{3} + \frac{1}{3} = \frac{2}{3} \quad (7.12)$$

If we compare the neutron, in which now $z_e = 4$ elementary vortices are involved, with the proton:

$$\frac{r_n}{r_p} = \frac{z_{ep}}{z_{en}} \cdot \frac{E_p(r_2)}{E_n(r_3)} = \frac{3}{4} \cdot \frac{1}{2/3} = \frac{9}{8} = 1{,}125 \quad (7.13)$$

then we infer from the arithmetically determined result that the neutron according to the radius is 12,5% bigger than the proton. The mass is calculated to:

$$\frac{m_n}{m_p} = \frac{z_{en}}{z_{ep}} \cdot \left(\frac{r_p}{r_n}\right)^2 = \frac{4}{3} \cdot \left(\frac{8}{9}\right)^2 = 1{,}05 \quad (7.14)$$

The particle therefore has a mass which is 5% larger than for the proton, slightly more as has been measured for the neutron. The difference is acceptable. The particle after all is structured very asymmetrically, in which the reason is to be seen, why the uncharged particle, looked at from close up, nevertheless shows an observable charge distribution.

Decay equations if neutrinos are involved:

$$n^0 \longrightarrow p^+ + e^- + \bar{\nu}_e \qquad (7.15)$$

$$n^0 + \nu_e \longrightarrow p^+ + e^- \qquad (7.15^*)$$

$$\mu^- \longrightarrow e^- + \bar{\nu}_e + \nu_\mu \qquad (7.16)$$

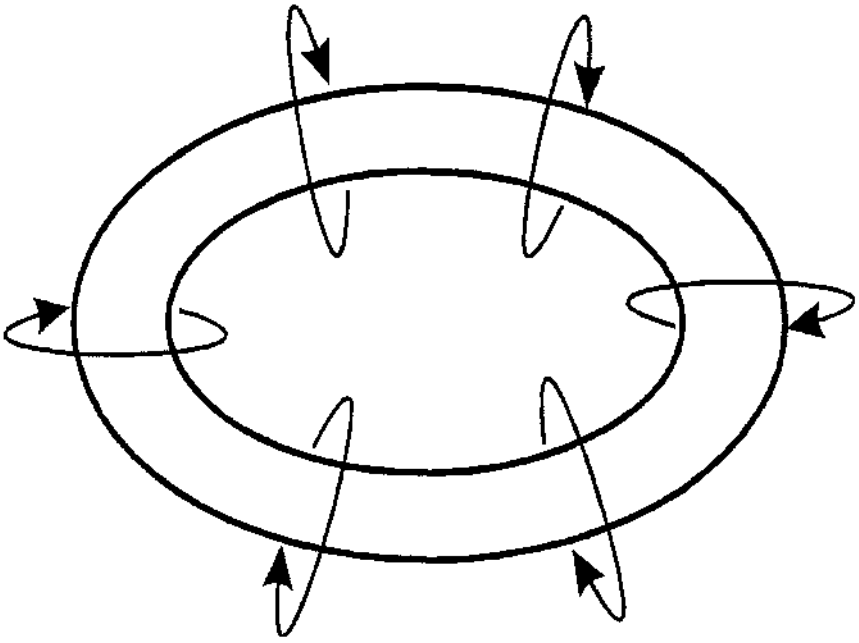


Fig. 7.12: The electron-neutrino as a ring-like vortex

7.12 ß-decay

In the case of the calculated quasistable particles, the μ^- and the n°, the verification by means of the well-known decay processes is still due. Also free neutrons, those which are not bound in an atomic nucleus, decay. But with an average life of 918 seconds they are by far the longest living among the quasistable elementary particles. Should the neutron decay be triggered by neutrinos, then obviously a distant flying past does not suffice. For that the electron is bound in the proton too tight. There probably has to occur a direct "crash", in which a neutrino is used, since the decay equation reads:

$$n^0 \longrightarrow p^+ + e^- + \bar{\nu}_e \quad (7.15)$$

As could be expected a proton p^+, an electron e^- and the mentioned electron-antineutrino ν_e are formed. What here is written down as the emission of an antiparticle, is equivalent in the absorption of the particle<i>, in this case of the neutrino. The reaction equation 7.15 can be reformulated accordingly<i>:

$$n^0 + \nu_e \longrightarrow p^+ + e^- \quad (7.15^*)$$

Also for the decay of the myon an electron-neutrino is used. In both cases it provides the energy necessary for the decay. But we can really understand the β-decay only, after we have got to know these particles better.

Without charge and without mass neutrinos show hardly any interactions with matter and as a consequence they possess the enormous ability of penetration - as is well-known. They are said to participate in the „weak interaction", which should trigger a conversion of the concerned particles, which is their decay. Pauli already has postulated the neutrino 1930 theoretically, because the transition from a half-integer spin to an integer spin for the n^0 -decay otherwise wouldn't have been explicable.

If we imagine an elementary vortex is being born, but the local field strength and energy isn't sufficient for obtaining a quantized state. The result is an incomplete potential vortex, which has an open vortex centre and as a consequence shows no localization at all. In the form of a vortex ring it oscillates around itself, while it continually turns its inside to the outside and then again to the inside.
One moment the vortex ring is green, then it is red again, one moment matter, then anti-matter, one moment positively charged and the next moment negatively charged. In contrast to the photon the number of the involved elementary vortices z_e for the neutrino is odd (for the ν_e $z_e = 1$). Perpendicular to the direction of propagation the neutrino has a spin $(s/\hbar = ½)$ for reason of a rotation, which overlaps the pulsating oscillation. This vortex ring is, as said, not a member of stationary matter, because it doesn't form a "black hole" in its centre, where the speed of light becomes zero. But it has an absolute stability like every elementary vortex, even if it only occurs incomplete and hence not in any quantized form,. This concept of the electron-neutrino as an open oscillating elementary vortex in the form of a ring-like vortex covers the experimentally determined realizations unexpectedly well.

<i>: Kussner, H.G.: Grundlagen einer einheitlichen Theorie der physikalischen Teilchen und Felder, Musterschmidt, Gottingen 1976, S.155

A strong interaction doesn't exist. The electric field in the proximity of the proton goes to zero within the range which is determined with measuring techniques.

A weak interaction doesn't exist. That interaction only is a special case of the electromagnetic interaction which appears in a weakened form.

XII: Why does the proton have approximately 3 times the magnetic moment which can be expected for reason of the only single charge?
(3 elementary vortices)

XIII: Why does the neutron as an uncharged particle anyway have a magnetic moment?
(Structure of the n°)

XIV: What owes the atomic nucleus, which consists of like charges, its stability?
(Course of the field of the p^+, instead of "strong interaction")

XV: Why does the free neutron decay, although it is stable as a particle of the nucleus?
(Interaction with neutrinos)

XVI: Why do neutrinos nevertheless participate in the "weak interaction", although they have no mass and no charge?
(Oscillating charge)

XVII: How can be given reasons for the finite range of the "weak interaction"?
(Reaction cross-section for particle decay)

Fig. 7.13: Further key questions of quantum physics (Continuation of figures 4.4 and 6.13)

7.13 "Weak interaction"

Let's now look again at the ß-decay of the neutron, in which a neutrino ν_e is used. But this by no means will be a process of the weak interaction. Instead will neutrinos, contrary to the textbook opinion, participate in the electromagnetic interaction. They after all are one moment positively charged and the next moment negatively charged. With slow-acting gauges this it is true can't be proven, because the interaction is zero on the average. But this charged oscillating vortex ring can exert a considerable effect while approaching a neutron, which is based solely on the electromagnetic interaction.
The neutron is stimulated to synchronous oscillations of its own by the high-frequency alternating field of the neutrino, until it in the case of the collision releases the bound electron, which takes up the energy provided by the neutrino and transports it away. The interaction obviously is only very weak due to the oscillation. But a physical independency of it has to be disputed.
The finite range, which is given in this context, indicates the reaction cross-section around the n°-particle, within which the "crash" and as a consequence the β-decay occurs. This range is considerable larger as the particle itself. The electromagnetic interaction for such small distances after all is so violent, even if it only occurs in pulses, that the neutrino is thrown out of its path and can fly directly towards the neutron.

Perhaps we now understand also the β-decay of the myon. It actually were to be expected that without outside disturbance an absolute stability could exist because of the ideal symmetry of the μ^-. On our planet we however are in every second bombarded with approx. 66 milliard (billion) neutrinos per cm^2 <i>. Obviously it takes 2,2 µs on the average till a neutrino ν_e flies past a myon so close that it decays. In doing so it stimulates the outside elementary vortex to violent oscillations by trying to synchronize it. In this case the electron-neutrino ν_e carries away with it the two outer, and therefore weaker bound, elementary vortices of the myon, which meanwhile are oscillating synchronously. The innermost vortex, an electron e^-, is left behind. The decay of the myon which takes place with a probability of almost 100 % reads:

$$\mu^- \longrightarrow e^- + \overline{\nu}_e + \nu_\mu \quad \text{resp.} \quad \mu^- + \nu_e \longrightarrow e^- + \nu_\mu \qquad (7.16)$$

Thus a different neutrino ν_μ, is formed which can be distinguished from the ν_e and is called myon-neutrino since it forms from the μ^-. Actually it even has a similar structure of three shells, as is shown in fig. 7.5. But the vortex centre is open and the particle isn't stationary anymore. In the picture now only a momentarily state is shown, in which the ν_μ appears green on the outside and red in its open centre. As already for the ν_e oscillates also here the inside to the outside and vice versa, this time merely as a packet of three shells, so that also this particle shows all the typical neutrino properties discussed for the example of the ν_e.
The for potential vortices typical and already discussed phenomenon of transport here has an effect. In particular in connexion with vortex rings this property is known from hydrodynamics. It thus can be observed, how vortex rings bind matter and carry away with them. Because the neutrino is not quantized, it neither is restricted with regard to its ability to transport elementary vortices. Consequently even bigger configurations are conceivable, like configurations of 5 shells, 7 shells etc..

<i>: "Zeugen aus der Sonne", VDI-Nachrichten Nr. 45 vom 9.11.90, Seite 26

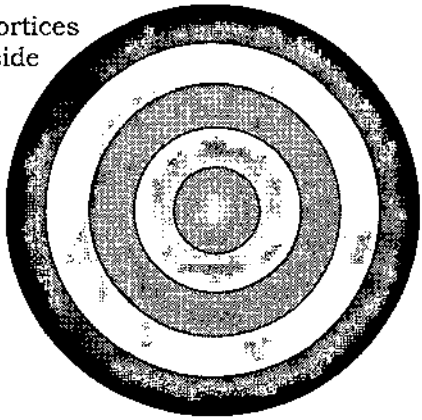
a: the structure of the tau-neutrino with 5 shells

colour of the elementary vortices
from the outside to the inside

gn/rd/gn/rd/gn

i.e.

$e^-/e^+/e^-/e^+/e^- = \nu_\tau$



b: the heavy and stable variant of the tau particle

(gn/rd + gn/rd)gn

resp.

$(e^-/e^+ + e^-/e^+)e^- = \tau^-$

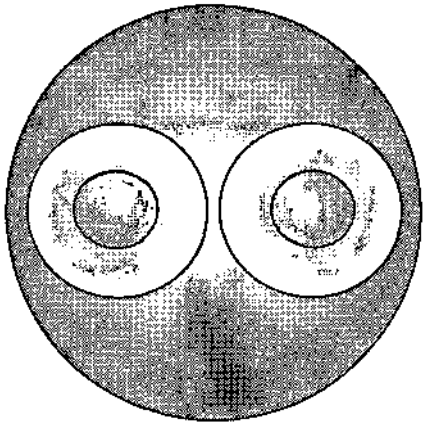


Fig. 7.14: Tau-neutrino and tau particle

7.14 Tau particle

In the table of the leptons after the e^- and the μ^- as the next particle the tau particle τ^- is found with its accompanying neutrino ν_τ. The obvious solution for the tau particle is the structure of five shells, as is shown in fig. 7.14a. With that the electron would have another particularly heavy relative with otherwise very similar properties.
For the myon the neutrino was stable, the particle itself however instable. We after all huve explained the particle decay as a consequence of an outside disturbance, and disturbances always are based on interactions. Correspondingly should, with the small possibility for an interaction, also the neutrino ν_τ of the tau particle have a better stability than the particle τ^- itself.
Without doubt this structure of 5 shells fulfils all known quantum properties like spin, charge etc. Merely the check of the mass is still due. This we now want to calculate for the structure shown in fig. 7.14a.

$$m_5 = m_p \cdot \left(\frac{z_{et}}{z_{ep}}\right)^3 \cdot \left(-\frac{r_1}{r_5} + \frac{r_2}{r_5} - \frac{r_3}{r_5} + \frac{r_4}{r_5}\right)^2 \quad (7.17)$$

$$m_5 = 1836 \cdot \left(\frac{5}{3}\right)^3 \cdot \left(\frac{2}{5}\right)^2 \cdot m_e = \underline{\underline{1360 \cdot m_e}} \quad (7.17^*)$$

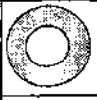
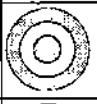
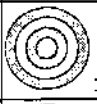
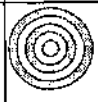
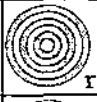
But the for the tau particle measured value is considerable higher!
Even if this structure is the only possible in the case of the neutrino ν_τ for reason of the complete symmetry, will the tau particle however change its structure by itself if another structure exists, which is more stable, thus in which the particle can take a bigger mass. Such a maximum provides the structure shown in fig. 7.14b after checking all possible configurations with five elementary vortices:

$$m_\tau = m_p \cdot \left(\frac{z_{et}}{z_{ep}}\right)^3 \cdot \left(\left(-\frac{r_1}{r_3} + \frac{r_2}{r_3}\right) \cdot 2\right)^2 \quad (7.18)$$

$$m_\tau = 1836 \cdot \left(\frac{5}{3}\right)^3 \cdot \left(\frac{2}{3}\right)^2 \cdot m_e = \underline{\underline{3778 \cdot m_e}} \quad (7.18^*)$$

This value now lies 8% above the measurement values. It would be obvious, if unbound tau particles predominantly would take the structure shown in fig. 7.14b. The remaining error becomes explicable, if a very small number of tau particles in the lighter structure according to fig. 7.14a are involved with a correspondingly smaller probability.

The enormous variety of kinds of decay, and not a single one of the dominating ones has a probability of over 50%, makes it more difficult for us, to be able to directly infer the inner structure of a particle from the decay products. It nevertheless should be mentioned that after all 35% of all decays take place by taking up and using a neutrino ν_e or ν_τ, entirely in accordance with the model of the myon decay (equation 7.16).

name	mass (m/m_e) measured	mass (m/m_e) calculated	el.-vortices z_e	charge Q	radius r/r_p	inner structure of The elementary vortices, colour: (gn=green; rd=red) from the inside to the outside
e^-	1	-	1	-1	-	Fig. 4.3 gn
γ^0		136	2	0	3	 Fig. 7.3 rd/gn
μ^-	207	204	3	-1	3	 Fig. 7.5 gn/rd/gn
η^0	1072	1088	4	0	1,5	 rd/gn/rd/gn
(ρ^-)	1509	1360	5	-1	1,5	 Fig. 7.14a gn/rd/gn/rd/gn
D^0	3650	3672	6	0	1	 rd/gn...rd/gn
D^+ or F^+	3658 till 4188	4284	7	+1	1	gn/rd...rd/gn
(B^0)	10321	8704	8	0	0,75	rd/gn...rd/gn

7.15 Table of vortices of the calculated leptons and mesons compared with measurement values (Part 1).

7.l5 Pions

Unlike the leptons, which we could derive and calculate fairly completely, the mesons don't have a half-integer spin. With this characteristic property they therefore can't represent an individually overlapped elementary particle and they probably will consist of the amassing in pairs of individual configurations of potential vortices. This kind of bond can't be particularly tight. Consequently we don't know any stable mesons.

The most important basic building part of the mesons we have got to know over the positronium in fig. 7.3. It necessarily has to amass to another particle, otherwise it annihilates under emission of a γ-quanta, as already mentioned. This γ^0-particle, as it will be named here, has the mass of:

$$m_{\gamma 0} = (2/3)^3 \cdot (1/2)^2 \cdot 1836 \cdot m_e = 136 \cdot m_e \quad (7.19)$$

which only can be determined arithmetically. As a partner, to which the γ^0-particle can amass, first of all another γ^0-particle should be considered. Because both partner will rotate against one another, this new particle would not have a spin and moreover would be uncharged. The mass now would be twice as big with:

$$m_{\pi 0} = 2 \cdot m_{\gamma 0} = 272 \cdot m_e \,. \quad (7.19^*)$$

But the two γ^0-particles will come very close together and mutually feel the local, in the same direction orientated, distribution of the field, which will lead to a weakening of the field and as a consequence to a slight reduction of the mass.
With these properties it probably concerns the uncharged pion π^0. This model concept finds an excellent confirmation in the two possible kinds of decay, which can be regarded as equivalent:

$\pi^0 \longrightarrow \gamma + \gamma$ with a probability of 99%
and

$\pi^0 \longrightarrow \gamma + e^- + e^+$ with a probability of 1%

A1so in the case of the charged pion $\pi^\pm$ the observable decay offers a big help, which will take place with a frequency of almost 100 %:

$$\pi^\pm \longrightarrow \mu^\pm + \nu_\mu$$

The equation doesn't state anything about the fact, if a neutrino ν_e is used in the process. But it points at the circumstance that the partner of the γ^0-particle for the $\pi^\pm$ most likely is a myon $\mu^\pm$. The mass will be smaller than the sum of both building parts:

$$(204+136) * m_e = 340 * m_e.$$

name	mass (m/m_e) measured	masse (m/m_e) calculated	elem.-vortices z_e	charge Q	inner structure of The elementary vortices, colour: (gn=green; rd=red) from the inside to the outside
B^-	11194	9793 +?	9 +?	-1	$r/r_p = 0{,}75$ gn/rt...rt/gn
(Y^0)	18513	17001 +?	10 +?	0	$r/r_p = 0{,}6$ rt/gn...rt/gn

Some compound configurations

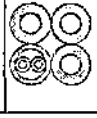
π^0	264	272	4	0	2 x fig. 7.3 $\gamma^0 + \gamma^0 = \pi^0$
π^-	273	340	5	-1	fig. 7.3 + fig. 7.5 $\mu^- + \gamma^0 = \pi^-$
τ^-	3487	3778	5	-1	fig. 7.14b (2x gn/rd)/gn
(K^0)	974	918 +?	6 +?	0	$r/r_p = 2$ (2x rd/gn)/ rd/gn
(K^-)	967	939 +?	11 +?	-1	 (rd/gn + gn)/ rd/gn + 3 γ^0

Fig. 7.16: Table of vortices of the calculated leptons and mesons compared with measurement values (Part 2).

7.16 Table of vortices of the mesons

The numerous kinds of decay for K-mesons suggest that these strange particles will consist of various combinations of amassed together and in pairs rotating γ^0- and $\mu^{\pm}$-particles. The possibilities of combination now already have increased in such a way that for every kaon and other mesons several solutions can be proposed. To avoid unfounded speculations, only a few clues will be given.

Besides the γ^0-particles also heavier arrangements should be considered as partner for the spin and as a building part for kaons and other mesons.
If for instance a π^0 is overlapped by a γ^0, then this particle has an arithmetically determined mass of 918 m_e. It therefore can concern a building part of the uncharged kaon K^0.

The likewise with three γ^0 formed configuration of 6 shells however, if it actually would staystable for the duration of a measurement, would have the mass of 3672 electron masses<i>.

A very much better detectability must be attributed to the configuration of 4 shells which consists of two γ^0, so to speak a heavy relative of the γ^0 and the π^0. It among others should be able to decay like a π^0. With this property and with an arithmetically determined mass of 1088 m_e it actually only can concern the η^0-meson. Solely according to the numeric value the η^0-meson could also consist of four π^0-mesons; but the decay in only two light quants speaks against it.

The kaon-puzzle in addition is made more difficult by the spontaneously possible ability to change of the involved γ^0-particles during a process of decay, as is made clear by the numerous kinds of decay. These dependent pion halves can be "swallowed" or "spit out" by neutrinos in the process, they can form from incident light or be emitted as photons and eventually they even can break up in their individual parts.

In fig. 7.16 the possible configurations of potential vortices are sketched and the respective, according to the new theory calculated, mass is given. If above that the other decay products and quantum properties, which can be given for the vortex structures, are added, like e.g. charge, spin and if need be magnetic moment, then an assignment without doubts to the until now only from measurements known elementary particles is possible. In order to better be able to assess the efficiency of the potential vortex theory, the measurement values are compared to the calculated values.

Some terms are put in brackets, because it can be assumed that the calculated part only concerns the dominating part, to which further γ^0 or other small configurations of vortices will amass for reason of its high mass. Correspondingly should the mass in that case be corrected slightly.

<i>: It could e.g. concern the D°-meson.

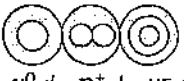
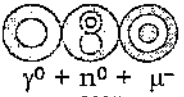
name	way of decay	mass (m/m_e) measured	mass (m/m_e) calculated	elem.-vortices z_e	charge Q	Inner structure of the baryon vortices
p^+	stable	1836	- (reference value)	3	+1	fig. 7.8 $r/r_p = 1$ $(2x\ e^+)/e^-$
n^0	$p^+ + e^- + \bar{\nu}_e$ (100%)	1839	1837	4	0	figure 7.10a $p^+ + e^-$
			1934	4	0	figure 7.10b n^0 $r/r_p = 1{,}13$
Λ^0	$p^+ + \pi^-$ (64%)	2183	(2176)	8	0	 $\gamma^0 + p^+ + \mu^-$ (64%)
	$n^0 + \pi^0$ (36%)		2187 (2206)	8	0	$\gamma^0 + n^0 + \gamma^0$ (36%)
Σ^+	$p^+ + \pi^0$ (51%)	2328	(2108+?)	7 + ?	+1	$\gamma^0 + p^+ + \gamma^0$ (+?) (51%)
	$n^0 + \pi^+$ (49%)		2142+? 2177	9	+1	$\gamma^0 + e^+ + p^- + \mu^0$ (49%)
Σ^-	$p^+ + \pi^-$ (100%)	2343	2274	9	-1	 $\gamma^0 + n^0 + \mu^-$ (100%)

Fig. 7.17: Table of vortices used for the calculation of the most important barvons with suggestions for the structure (Part 3).

7.17 Table of vortices of the baryons

The number of possibilities of combination quickly increases, if only a few elementary vortices extend the structure of a particle. This probably is the reason for the large number of observable hyperons, which recently have been produced artificially and observed with the help of particle accelerators.

Both the neutron and the lambda particle can exist in a lighter and a heavier variant. At the moment of the decay, as it for instance is observed in a bubble chamber, according to expectation the state with the smaller mass takes the bigger probability. But in the amassing with further particles as building part of bigger and heavier hyperons the heavier structure is more likely. This circumstance should be considered in calculating the mass of the hyperons.

In figures 7.17 and 7.18 the most important baryons are listed, which are characterised in the way that one of the amassed together packets of vortices is a nucleon, thus a proton or a neutron.

The given, from measurements known, kinds of decay are able to confirm the inner structure pretty good. Of course an infinitely lot of combinations are conceivable and numerous predictions are possible. But speculations are unnecessary from the time on where we are able to calculate the particles!
The restriction to the few in the table listed particles seeming to be important hence doesn't limit the universal importance of the theory of objectivity in any way!

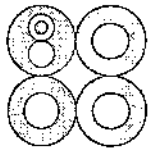
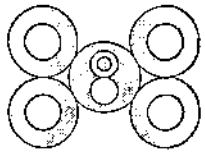
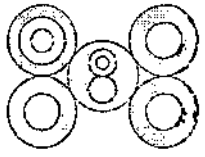
name	way of decay	mass (m/m_e) measured	mass (m/m_e) calculated	elem.-vortices z_e	charge Q	Inner structure of the baryon vortices
Σ^0	$\Lambda^0 + \gamma$ (100%)	2334	2342	10	0	 $n^0 + \gamma^0 + \gamma^0 + \gamma^0$ (100%)
Θ^0	$\Lambda^0 + \pi^0$ (100%)	2573	2478	12	0	 $n^0 + \gamma^0 + \gamma^0 + \gamma^0 + \gamma^0$ (100%)
Θ^-	$\Lambda^0 + \pi^-$ (100%)	2586	2546	13	-1	 $n^0 + \gamma^0 + \gamma^0 + \gamma^0 + \mu^-$ (100%)
(Ω^-)	$\Lambda^0 + K^-$ (69%)	3273	3172 +?	17 +?	-1	$n^0 + \gamma^0 + \gamma^0 + ?$ (31%: ? = div.)

Fig. 7.18: Table of vortices used for the calculation of the most important baryons with suggestions for the structure (Part 4).

8. Unified theory

With the theory of objectivity the longed for goal of a "theory of everything" (TOE), of an universal theory, seems to have moved within reach. If in the nineteenth century still promising field theories and approaches were being discussed, then has at the latest Einstein's theory of relativity destroyed all hopes in such a theory. Science as a consequence has become very much more modest and understands a TOE only as the unification of all known interactions.

Einstein has stated the minimum demand so: "a theory should be favoured by far, in which the gravitational field and the electromagnetic field together would appear as a whole" <i>. It is evident that a subjective or relativistic observer theory never is able to achieve this.

The presented theory of objectivity made it possible that the unification here for the first time actually has succeeded. This undoubtedly brings science a whole lot further, but it still is not sufficient to lie one's hands in one's lap being content with oneself. After all we still know very much more phenomena, which likewise should be unified. After all it is no accident that both Maxwell and Einstein, to name only two prominent representatives, after completion of their well-known works have struggled for the question, what sort of phenomenon it concerns in the case of the temperature and how this could be integrated in their theory.

The requirement reads: We must be able to derive all basic factors, which influence our system of units with their basic units, as a compulsionless result from the new theory. Besides the dimensions of space and time which determine our continuum, the explanation and unification of the basic factors mass and charge has to be tackled. If we have succeeded in doing so, we'll also tackle the problem of the fifth and last basic factor, which until now has put itself in the way of any unified theory as the question of fate, the problem of the temperature!

<i>: Einstein, A.: Grundziige der Relativitatstheorie, Vieweg+Sohn, Braunschweig 1973, 5. Aufl., WTB 58. Seite 97.

"A theory should be favoured by far, in which the gravitational field and the electromagnetic field together would appear as a whole" <i>

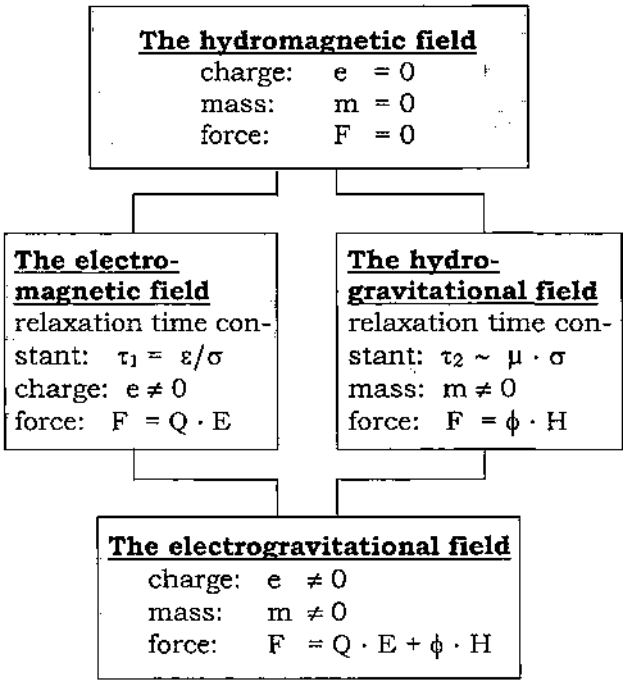

The hydromagnetic field
charge: e = 0
mass: m = 0
force: F = 0
The electro-magnetic field
relaxation time con-stant: $\tau_1 = \varepsilon/\sigma$
charge: $e \neq 0$
force: $F = Q \cdot E$
The hydro-gravitational field
relaxation time con-stant: $\tau_2 \sim \mu \cdot \sigma$
mass: $m \neq 0$
force: $F = \phi \cdot H$
The electrogravitational field
charge: $e \neq 0$
mass: $m \neq 0$
force: $F = Q \cdot E + \phi \cdot H$

Fig. 8.1: Structuring of the fields and definition of terms

<i>: Einstein, A. : Grundziige der Relativitatstheorie, Vieweg + Sohn, Braunschweig 1973, 5. Aufl. , WTB 58.

<ii>: derived from the Greek hydro (= water).

8.1 Structure of the field theory

In contrast to Maxwell's theory the new field theory, which we derived from duality, is also able to describe fields, in which no particles and no quanta exist. It probably is justified and useful in the sense of a clearer communication, to give the new field a name of its own.
The author recommends the introduction of the term "hydrotic field". In it should be expressed, which importance water has for both the like named potential vortex and this field<ii>.
As we already have worked out, the hydrotic field is favoured particularly by polar materials and by a high dielectricity. Water is a corresponding and in the biosphere of our planet dominating material.

Whereas we had to correct the concept of a vortex free electric field, we had until now, considerable, we can take over the description of the magnetic field unchanged. This then should also be valid for its name. The new field which consists of both correspondingly is called hydromagnetic field.

In fig. 8.1 we recognize the structure. At the top stands the "hydromagnetic field", which is described mathematically by the equations of dual electrodynamics in fig. 3.3. It does not know quanta and as logical consequence neither charge nor mass! If we insert these equations, Ampere's law and the dual formulated Faraday law of induction, into each other, then there results as a mathematical description of our space-time-continuum the fundamental field equation (5.7, fig. 5.1). As a new physical phenomenon the potential vortex appears, which gives the hydromagnetic field a new and important property: this field can be quantized!

Starting-point is the wave, which for corresponding interference effects can spontaneously roll up to a vortex, which as highly concentrated spherical vortex finds a new right to exist and finds to a new physical reality.

The in the described manner formed particles show specific properties of their own. We now are able to attribute them for instance a charge or a mass. And these properties also can be investigated and described individually and isolated from each other. Thus are formed the two special cases, strange by nature, on the one hand the well-known, with the help of the Maxwell equations describable "electromagnetic field" and on the other hand the new "hydrogravitational field".

If we overlap the results of the two special cases, e.g. by adding the force effects of electric charges and accelerated masses, then we summarized obtain a field, which we accordingly should call "electrogravitational". This case is not at all unknown. Already Niels Bohr in this way has calculated the radii of the electron orbits in the hull of his model of the atom, to mention only one example. We can summarize:

The hydromagnetic field is the all encompassing and with that most important field. Apart from that the electromagnetic field of the currents and the eddy currents and the hydro-gravitational field of the potentials and the potential vortices merely describe the two possible and important special cases. For reasons of pure usefulness for every special case a characteristic factor of description is introduced, the charge and the mass!

Auxiliary terms (description of quantum properties):
* mass * charge * temperature * Planck's quantum of action

The hydromagnetic field does not know any quanta!

Structure of the fundamental field equation 5.7 (fig. 5.1):

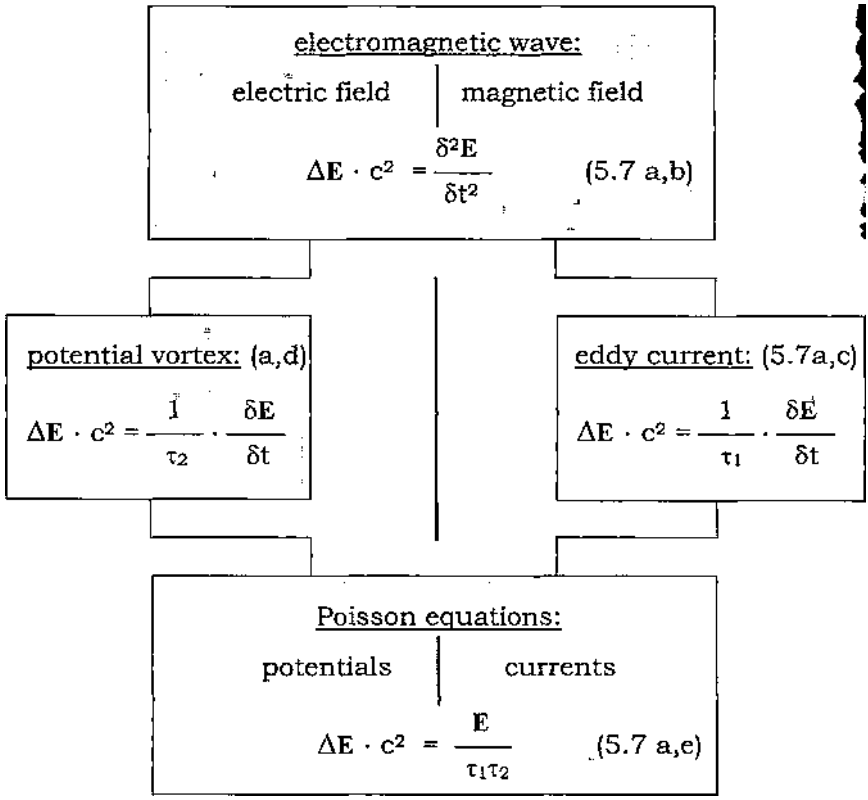

electromagnetic wave:
electric field
magnetic field
$\Delta E \cdot c^2 = \frac{\delta^2 E}{\delta t^2}$ (5.7 a,b)
potential vortex: (a,d)
$\Delta E \cdot c^2 = \frac{1}{\tau_2} \cdot \frac{\delta E}{\delta t}$
eddy current: (5.7a,c)
$\Delta E \cdot c^2 = \frac{1}{\tau_1} \cdot \frac{\delta E}{\delta t}$
Poisson equations:
potentials
currents
$\Delta E \cdot c^2 = \frac{E}{\tau_1 \tau_2}$ (5.7 a,e)

Fig. 8.2: Unified theory

*electromagnetic interaction (open field lines)
*gravitation (closed field lines)
*strong interaction (does not exist)
*weak interaction (only special aspect)

The interactions are a result of the field dependent speed of light!

8.2 Unification of the interactions

The discovery and introduction of the hydromagnetic field makes the desired unification possible, because the electromagnetic resp. Maxwell field, which describes the electromagnetic interaction, and the hydrogravitational field of the gravitation can be derived from this field as a consequence of the formation of quanta.
The kind of the interaction is caused by the course of the field lines of the field quanta which form as spherical vortices: the open field lines make the electromagnetic interaction possible. And the field, lines with a closed course lead to gravitation. Both are a direct result of the field dependent speed of light. A more perfect unification seems hardly possible.

As the next step the unification with the strong and the weak interaction is required, but it could be shown that those don't exist at all. It just concerns misinterpretations with much fantasy, which should help explain the difference between a wrong theory and the physical reality.

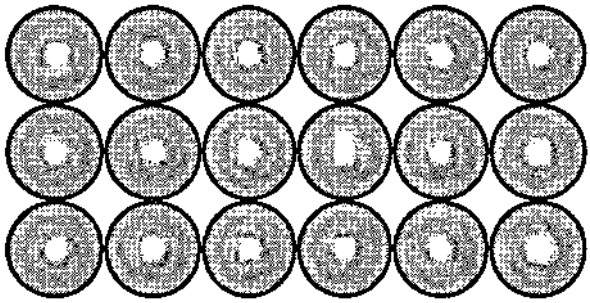
Numerous auxiliary terms for the description of the quantum properties exist, like for instance mass, charge or Planck's quantum of action. The prerequisite for their usability naturally is the existence of the quanta. But until these have found to a physical reality, the auxiliary terms are unnecessary. The hydromagnetic field does not know quanta, quantum properties or auxiliary descriptions. It will be shown that, according to expectation, also the temperature is a typical quantum property, which comes within the group of the auxiliary terms. In this way also the temperature is fitted into the unified theory without compulsion.

Without the by us for reasons of usefulness introduced auxiliary terms the fundamental field equation is left with its description of a spatial-temporal principle. If a world equation should exist, then this field equation 5.7 has the best prerequisites.
For the fundamental field equation the division in four parts is repeated like already for the hydromagnetic field (fig. 8.1). It likewise consists of four individual parts, the wave (b), the two vortex phenomena (c and d) and the time independent term (e) (fig. 8.2). Whereas the duality still is combined in the wave, it comes to light clearly for the vortices to again be combined in the fourth case. Here arise however potentials and currents, which again can react and oscillate with each other, for instance as L-C-resonant circuit in an electronic circuit, with which the principle is repeated.
This principle is shown clearer for the phenomenon of the temperature as in all other cases. If we start at the top in the picture in fig. 8.2 we have an electromagnetic wave, which is absorbed and thus becomes a vortex. If the vortex falls apart, then eddy losses are formed. We observe that the temperature rises and propagates in the well-known manner. We have arrived in the bottom box, but this again can be taken as the top box for the now following process, because the equation of heat conduction is a vortex equation of type c or d! We discover a self-similarity:

> The spatial-temporal principle formulated mathematically by the fundamental field equation can be carried over into itself time and again.

Temperature is the oscillation of contraction of the elementary vortices resulting from the speed of light depending on field strength.

a. at absolute zero temperature:



b. if thermally excited:

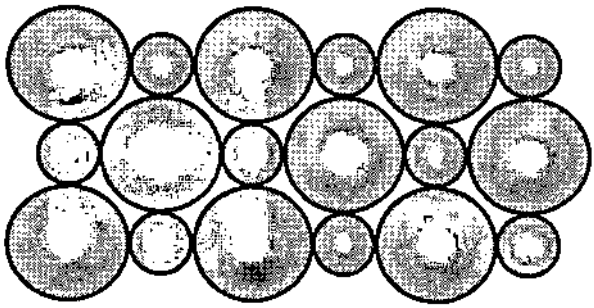


Fig. 8.3: Temperature as an oscillation of size for the speed of light depending on field strength

8.3 Temperature

Following the atomic view, in the case of heat it concerns kinetic energy of the molecules, which carry out more or less violent oscillations. In the case of gaseous materials with this concept, basing on mechanical models, actually successful calculations are possible, like for instance the speed distribution of gases won by Maxwell from theoretical considerations concerning probability.

But the attempt to apply the formulas of the kinetic theory of gases to solids and liquids only succeeds, if additional supplements and improvements are introduced. Since at all events it concerns temperature, thus the same physical quantity, of course also an uniform interpretation should be demanded, which in addition should stand in full accord to the presented design of an integrated theory (TOE).

Against the background of the new theory of objectivity we consider, what happens, if for instance the local field strength is increased by a flying past particle. The matter located at this point is contracted for a short time. By coming closer to each other, the individual elementary vortices mutually reinforce their field and are further compressed. Sometime this process comes to a standstill, is reversed and swings back.

At the same time every single particle, which in this way carries out an oscillation of size, has an effect on its neighbours with its field, to also stimulate these to the same oscillation, but delayed by some time. This phenomenon spreads in all directions. The propagation only will become stationary, if all neighbouring elementary vortices pulsate with the same amplitude. It now should be recorded:

> The oscillation of contraction of the elementary vortices we call temperature.

Also this thermodynamic state variable therefore is a result of the variable speed of light. At the absolute zero of temperature no oscillation takes place anymore, whereas the upper limit lies in infinity. Since the cause for temperature represents an oscillation of the local electromagnetic field strength around the cosmic field strength, the following phenomena must be considered as excitation and cause, as dictated by the fundamental field equation 5.7:

1. Electromagnetic waves (b) are able to stimulate matter particles to synchronous oscillations of contraction by their alternating field. In doing so energy in form of heat is transferred to the particles, with the result that their temperature is increased. The wave is absorbed completely, if the thermal oscillation corresponds with the frequency of the wave.

We speak of thermal radiation.

2. But also the two dual vortices, the eddy current (c) and the potential vortex (d) can cause oscillations of contraction. This immediately becomes clear, if we consider a vortex as the special case of the wave, in which the oscillation takes place around a more or less stationary vortex centre. In the case of the decay of vortices, of the transition of energy from vortices to matter, the increase in temperature is measurable.

In the case of this process of diffusion we speak of eddy losses and of loss heat.

Answers to open questions of thermodynamics:

1. Temperature occurs independent of the state in which the matter is (unified theory).

2. Temperature even occurs in solids, where a purely kinetic interpretation fails (unification).

3. Each elementary particle is carrier of a temperature.

4. Expansion with increasing temperature because of the increasing need for room for larger amplitude of oscillation (principle: bi-metal-thermometer).

5. For solids the thermal oscillation of size is primarily passed on by the electrons in the atomic hull. Good electric conductors therefore at the same time also have a high thermal conductivity. (principle: electrical resistance thermometer).

6. For gases the entire atoms carry out this task, for which reason a kinetic auxiliary description becomes applicable.

7. For extreme amplitudes of oscillation the atoms partly or entirely lose their enveloping electrons, when they change into the plasma state.

8. The second law of thermodynamics loses its claim to be absolute and at best reads: with today's technology we are not capable, to design a cyclic working machine, which does nothing else, as to withdraw heat from a heat container and to convert it into mechanical work.

Fig. 8.4: Questions concerning thermodynamics

3. Flying past particles, in particular unbound and free movable charge carriers (e) produce an alternating field for other fixed particles. Doing so kinetic energy can be transformed in temperature, thus in energy of pulsation. A good example is the inelastic collision. But it can also be pointed to numerous chemical reactions. Whoever searches for a concrete example, takes two objects in his hands and rubs them against one another. In that case the particles which are at the frictional surfaces are being moved past each other in very small distance, in this way causing oscillations of pulsation, which propagate into the inside of the objects according to the thermal conductivity. We speak of friction heat.

This model concept provides sound explanations for a whole number of open questions (fig. 8.4), i.e. why the temperature occurs independent of the state (1) and even in solids, where a purely kinetic interpretation fails (2). Every single elementary particle after all is carrier of a temperature (3).
With increasing temperature most materials expand, because the need for room, purely geometrically seen, increases for larger amplitude of oscillation (4). This principle is used in the case of a bi-metal thermometer.
In the case of solids the thermal oscillation of size is passed on primarily by the electrons in the atomic hull (5). Good electric conductors therefore at the same time also have a high thermal conductivity. An example of an application is the electric resistance thermometer.
In the case of gases the entire atoms carry out this task, for which reason a kinetic theory becomes applicable as an auxiliary description (6).
For extreme amplitudes of oscillation the atoms partly or entirely lose their enveloping electrons, when they change into the plasma state (7).
Finally the model concept even limits the second law of thermodynamics, which contains the postulate that it is impossible to design a cyclic working machine, which does nothing else, as to withdraw heat from a heat container and to convert it into mechanical work (8).

8.4 Heat energy

The discussed oscillation of contraction shows two characteristic properties, which must be looked at separately: the amplitude and the frequency.

Temperature describes solely the amplitude of the oscillation of size.

The heat energy however is determined by both,
by the amplitude as well as by the frequency.

Consequently the ideas of temperature and heat energy should be kept strictly apart. It therefore isn't allowed to set this oscillation equal to the electromagnetic wave in tables of frequency.
To be correct two tables should be given, one for the wave, characterized by a propagation with the speed of light, and another one for oscillations of contraction, thus for stationary phenomena and phenomena bound to matter. The latter indeed can likewise propagate relatively fast by fluctuations of pressure in the case of acoustical sound frequencies or by free movable charge carriers in the case of heat conduction, but the velocity of propagation for sound or heat is as is well-known still considerably smaller than the speed of light. Thus an assignment without doubts can be made as to which kind of oscillation it concerns.

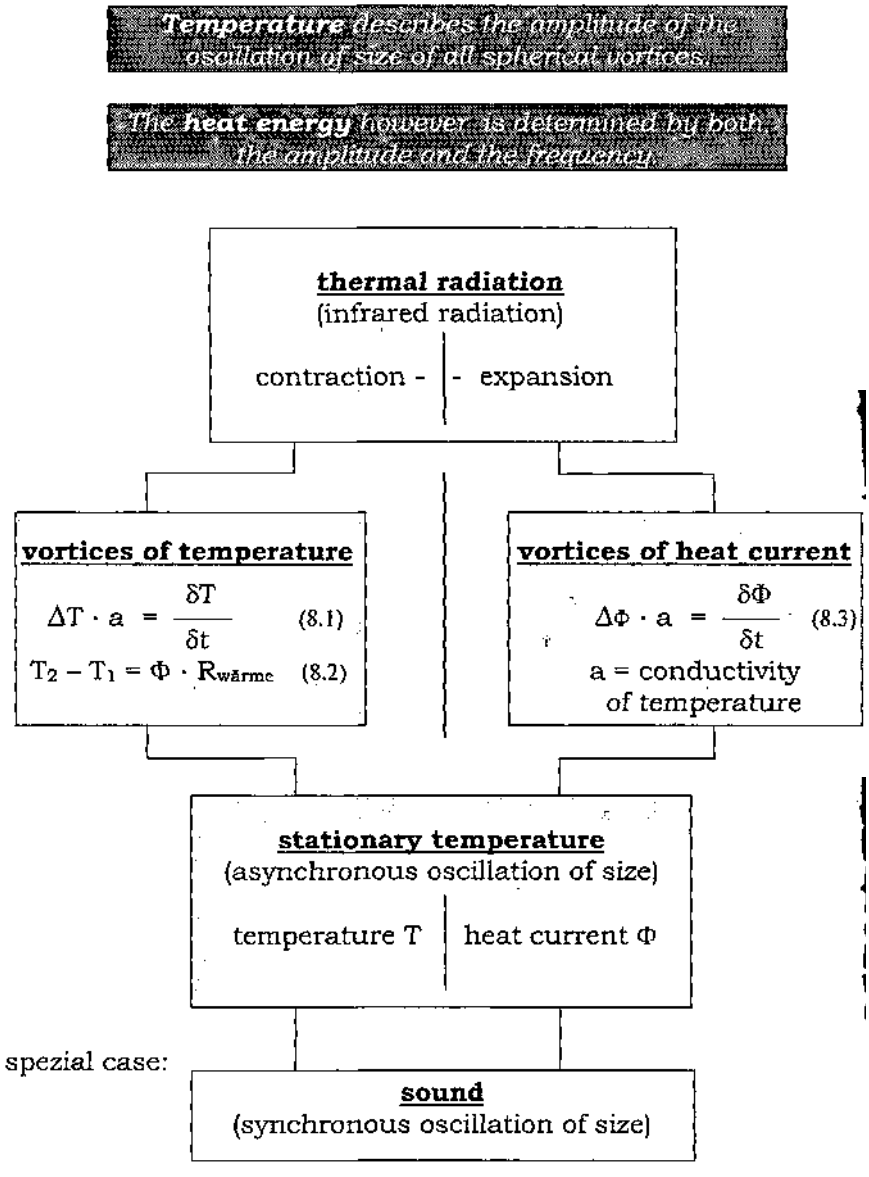

Temperature describes the amplitude of the oscillation of size of all spherical vortices.
The **heat energy** however is determined by both, the amplitude and the frequency.
thermal radiation
(infrared radiation)
contraction - - expansion
vortices of temperature
$\Delta T \cdot a = \frac{\delta T}{\delta t}$ (8.1)
$T_2 - T_1 = \Phi \cdot R_{wärme}$ (8.2)
vortices of heat current
$\Delta \Phi \cdot a = \frac{\delta \Phi}{\delta t}$ (8.3)
a = conductivity of temperature
stationary temperature
(asynchronous oscillation of size)
temperature T
heat current Φ
spezial case:
sound
(synchronous oscillation of size)

Fig. 8.5: Heat conduction resp. sound

8.5 Sound

The close relationship of longitudinal sound waves with the oscillations of contraction of thermally heated matter becomes particularly clear for ultrasound, where the arising heat in the inside of the body which is exposed to sound can be measured directly. The fundamental difference consists of the fact that the produced sound waves not only have the same frequency, but also the same phase, what needs not be the case for the temperature. The apparently uncoordinated occurring oscillations of size of the temperature, which as a rule occupy more space if the intensity increases, form a "thermal noise".

The oscillation of size with the same phase is not realizable at all in a spatial formation of particles, with one exception, the case that all particles expand and afterwards again contract simultaneously and in the same time. We can observe such a synchronization of the pulsation oscillations of all elementary vortices in the case of a pulsar. For us a pulsar looks like a "lighthouse" in space which shines with a fixed frequency.
In reality it as well can concern a constantly shining sun, which carries out a synchronized, thermal oscillation of size, like a gigantic low-frequency loudspeaker. During the phase of contraction of the star its emitted light stays back. To us the pulsar looks dark. In addition the field strength is extremely increased and the light becomes correspondingly slow. During the phase of expansion the conditions are reversed and we observe a light flash. Exactly the pulsar unambiguously confirms the here presented theory of the variable, field dependent speed of light.

The well-known fact that the microcosm represents a copy of the macrocosm, already suggests that each atom is capable of the same oscillation of size as a pulsar: if next to the oscillating atom a resting one is placed, then does this one see a smaller field during the phase of contraction because of the increasing distance. It hence becomes bigger itself. If the pulsating neighbouring atom afterwards expands, it however becomes smaller. The at first resting atom in this way becomes a "pulsar" oscillating with opposite phase.
The oscillating atom has stimulated the neighbouring atom as well to an oscillation of size, and this process will be repeated with the closest neighbouring atom. We speak of heat conduction.
To which extent the average distance between neighbouring atoms is influenced while a material is heated, solely depends on the structure of the atomic lattice. For matter with a fixed lattice according to expectation a smaller heat expansion will occur, as for the unordered structure of gases, in which we find confirmed well-known relations.

In a for potential vortices characteristic property sound waves and thermal waves of contraction correspond:

The propagation of potential vortex fields takes place as a longitudinal wave.

In this point vortex fields clearly differ from the transverse propagating electromagnetic waves!

1. Ampère's law (see fig 5.1):

$$\boxed{\text{rot } \mathbf{H} = \varepsilon \cdot (\mathbf{E}/\tau_1 + \delta\mathbf{E}/\delta t)} \qquad (5.1^*)$$

with relaxation time $\tau_1 = \varepsilon/\sigma$ (5.3)

transformed: $\delta\mathbf{E}/\delta t = (1/\varepsilon) \cdot \text{rot } \mathbf{H} - \mathbf{E}/\tau_1$ (5.1**)

integrated: $\mathbf{E} = \int [(\text{rot } \mathbf{H})/\varepsilon - \mathbf{E}/\tau_1]\, dt$ (5.1***)

---

2. Faraday's law of induction (in analogy):

$$\boxed{-\text{rot } \mathbf{E} = \mu \cdot (\mathbf{H}/\tau_2 + \delta\mathbf{H}/\delta t)} \qquad (5.4^*)$$

transformed: $\delta\mathbf{H}/\delta t = -(1/\mu) \cdot \text{rot } \mathbf{E} - \mathbf{H}/\tau_2$ (5.4**)

integrated: $-\mathbf{H} = \int [(\text{rot } \mathbf{E})/\mu + \mathbf{H}/\tau_2]\, dt$ (5.4***)

---

3. Signal flow diagram of the field equation 5.1***:

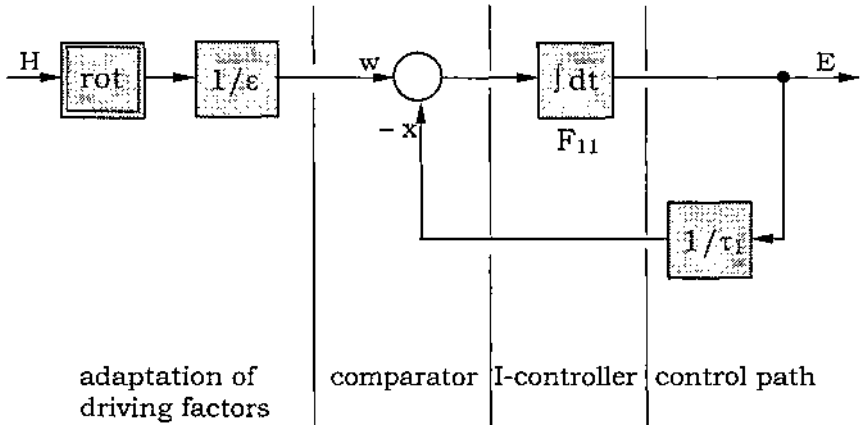


Fig. 8.6: Control technical analysis of the dual equations of the hydromagnetic field.

8.6 Basic principle of cybernetics

Surely can be attributed also information to the potential vortex. But how should information be formed? Is information a form of energy? Energy occurs as a consequence of the formation of potential vortices. Without this phenomenon there wouldn't be any energy!
Can information be described by means of a mathematical equation?
To be able to answer these questions, we subject the fundamental field equation to a control technical analysis. If it actually concerns a world equation, then an answers should be possible.

We again take up Ampere's law 5.1* from fig. 5.1 and remodel it according to the time derivative (5.1**). If the equation now is integrated over the time (5.1***), a signal flow diagram can be drawn (fig. 8.6).
The structure of a regulatory circuit is clearly visible. The individual paragraphs are described in an analogous way as for a technical control system. The execution of the curl operation on the field pointer of the magnetic field strength H and the multiplication with $1/\varepsilon$ accordingly form an adaptation of driving factors. In the comparator the difference for control from driving factor w and controlling factor x is formed and supplied to an integral controller. The control path has a purely proportional behaviour and consists of the processing of the measurement value of the electric field strength E with $1/\tau_1$, in which τ_1 describes the relaxation time of the eddy currents.
In technical control systems such a structure is found remarkably seldom, although it has an invaluable advantage: it possesses a stability in principle. Not a single adjustment of the controller exists, in which the closed regulatory circuit could become unstable, because it shows a proportionally delaying behaviour of first order. Possible changes of the adjustment of the controller or of the control path merely take effect on the speed, with which the regulatory circuit is able to follow changes of the driving factor.
This control technical basic principle convinces by its simplicity and efficiency. It meets us again in identical form in the second field equation 5.4*, the extended Faraday's law of induction. In dual formulation the electric field strength now appears as input factor and the magnetic field strength as output factor. Both regulatory circuits are coupled and connected with each other, by deriving their driving factor each time from the controlling factor of their dual partner. Is this structure actually efficient and meaningful?
Every regulatory circuit needs a target value, which is dictated from the outside. Let us think of the numerous control systems in nature. At all events a higher intelligence would be necessary for all the target values. This problematic is comparable to the question, what existed first: the egg from which a hen hatches or the hen without which no eggs can exist. Without a given target, evolution would not exist.

The connected regulatory circuit structure provides the matching answer: cybernetic systems, which usually and as is well-known strive to a state of balance, get their target value from their dual "partner". It is crucial that correspondingly dual systems are self-sufficient and can form and develop independently out of themselves without target values of a third side. This basic principle of cybernetics undoubtedly is brilliant.

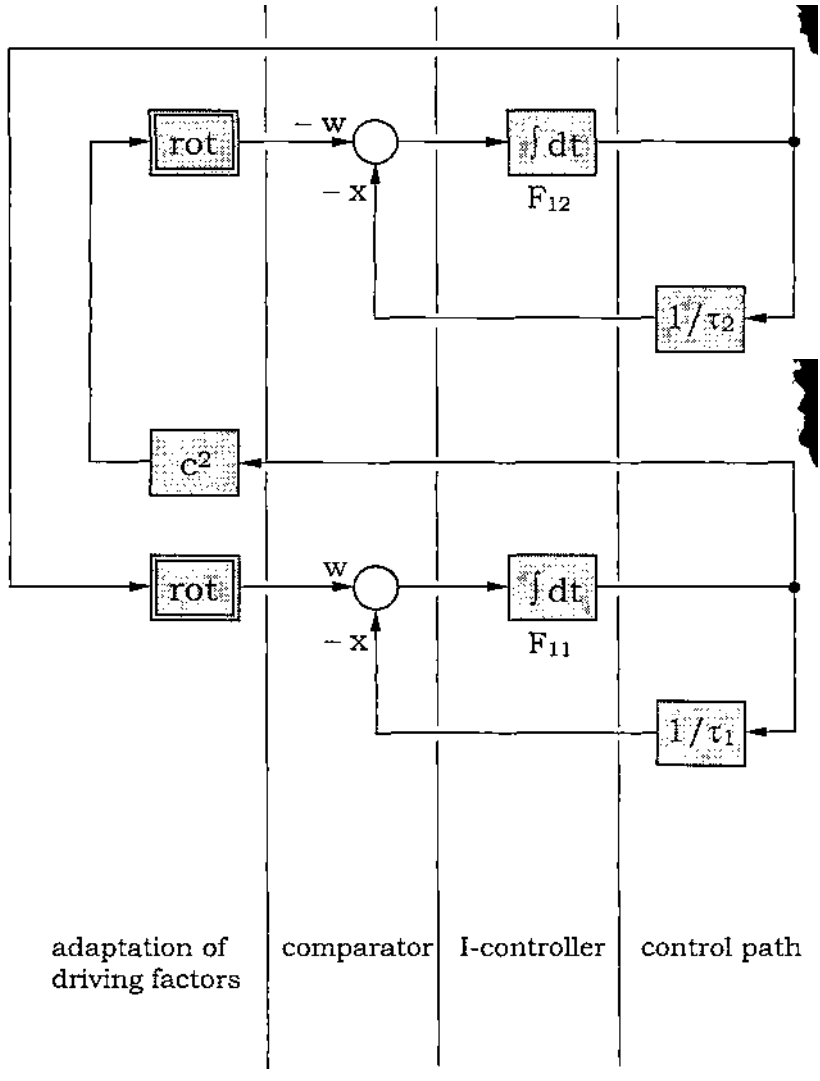


Fig. 8.7: Signal flow diagram of the fundamental field equation with adaptive structure.

8.7 Adaptive regulatory circuit structure

If out of the nowhere something like the cosmos or like life on earth should form, then the connected regulatory circuit structure basing on duality probably is the only possible and conceivable. Thus it merely concerns the control technical representation of the fundamental field equation.

The question for the efficiency not only concerns the stability, but equally the possibility of both systems, to oscillate and to communicate with each other by the coupling and the associated exchange of information.

Fig. 8.7 shows the signal flow diagram of both regulatory circuits. These are switched in line and form a coupled circuit, which itself can be interpreted as a third regulatory circuit. Also this one shows a change of sign in the circuit like the other two circuits.

The information technical interpretation could turn out as follows: information about a regulatory process in the lower regulatory circuit F_{11} caused for instance by a disturbance is communicated over the coupled circuit to the upper regulatory circuit F_{J2}. In this case F_{11} acts as transmitter and F_{12} as receiver of the information. Afterwards both exchange their places, because F_{12} for its part reacts by a regulatory process and reports to F_{11}. The regulatory circuits adapt to each other. Obviously it concerns the basic structure of an adaptive regulatory circuit.

To analyse the coupled circuit the examination of individual special cases is recommended. If the regulatory circuits F_{11} and F_{12} are opened up in the way that the time constants tau_1 and tau_2 go towards infinity, then the double integral effect is left. Analyses of technical regulatory circuit teach us that such systems always tend to instability. Because in addition the target value is zero, an oscillation around zero will arise, which we call electromagnetic wave.
If one of both time constants becomes finite, e.g. τ_2, then damping of the waves will occur. The "subordinate" cascade regulatory circuit F_{12} will adjust itself and now has a proportional delaying behaviour of first order. Together with the integral controller of the open F_{11}- circuit the coupled circuit will show the typical and more or less optimal regulatory behaviour of a damped oscillation.

These special cases correspond with the mathematical (fig. 5.2) and the physical (fig. 5.3) interpretation of the fundamental field equation. In addition a spatial rotation, a swirling will occur because of the double execution of the curl operation.

If interpreted control technically then vortices are the temporally stable, spatial swing of a field pointer around a centre, the vortex centre.

Without potential vortices no stability, no matter, no energy nor information would exist!

As can be looked up in Goethe's Faust, it always has been a desire of humanity, to find out, "what keeps the world together in the heart of hearts".

electric field	——	magnetic field
potential	——	current
capacitor	——	coil
Faraday's law of induction	——	Ampère's law
potential vortex	——	eddy current
convergence	——	divergence
dielectricity	——	permeability
non-metal	——	metal
isolator	——	electric conductor
tuned cavity	——	antenna
cold	——	hot
Yin	——	Yang
female	——	male
minus	——	plus
introverted	——	extroverted
stability	——	dynamics
water	——	fire
implosion	——	explosion

Fig. 8.8: Table of dual correspondences
(as a supplement to chapter 3.3 and fig. 4.2).

8.8 Information

The search for an answer for numerous philosophers and physicists was tantamount to the search for a world formula. Of course mustn't be forgotten that a formula only is a mathematical description and never the physical reality itself. It is a mathematical tool in the hand of a person and not the world or the cosmos itself, which he tries to understand. What keeps the world together in the heart of hearts, has to be more than only a pure apparatus of formulas. Actually the fundamental field equation tells us more. It reveals us a basic principle basing on duality in which the dual partners mutually dictate target values and goals. This principle convinces by its simplicity and efficiency. Apart from the "self regulation" it obviously also has the fundamental possibility of a "self organization" and the "generation of information". The field equations of the hydromagnetic field thus are the starting-point for the formation not only of matter and energy, but also of information. Accordingly holds:

Information is nothing but a structure of electromagnetic vortex fields!

This statement is new and to a large extent incompatible with the conception world of Norbert Wiener, who goes as the founder of cybernetics. From N. Wiener stems the sentence: "information is information, not matter and not energy".
We hold against it that obviously a fairly direct connection exists. We have worked out that only the vortex can show a stable adaptive regulatory circuit structure. Only the vortex and not the wave exists in two forms of formation dual to each other, and the principle of duality again is the prerequisite for the formation of information, of self organization and finally for the evolution. In fig. 8.8 well-known dual partnerships are listed. From it follows in a consistent way that for the production of information without exception the electromagnetic vortices should be considered.
But how can this so important duality occur, how can it form? This question is closely associated with the question of the formation of vortices. The signal flow diagram (fig. 8.7) to that says that the dual regulatory circuits F_1 and F_2 can only exist by the coupled circuit, which provides them the necessary target values and at the same time forwards the respective information. In this way of the oscillations and the more or less damped wave F_1 and F_2 communicate with each other.

The electromagnetic wave serves solely the mediation of information and energy.

With that falls a central role upon the wave, so that vice versa is valid:

Without wave no vortices, no duality and
consequently no evolution can exist.

According to the to date state of knowledge the basic principle of cybernetics forms the basis for matter and energy as well as for information. Since the wave can only serve the transmission of information, the principle of duality and the vortex will function as carriers of information. We are entitled, to speak of vortex information, this by no means is characterized by special frequencies or modulations of frequencies. This is prevented by the property of the vortices which allows them to change the frequency. On the other hand various configurations of vortices are possible and numerous combinations and modulations are conceivable.
If technical apparatus generate vortices, then they produce information. Here a serious danger with regard to the environmental compatibility can not be excluded!

Equivalent things:

* elements of the fundamental field equation 5.7
* elements of the Greek philosophy of nature
* temperaments
* (impulses of growth)

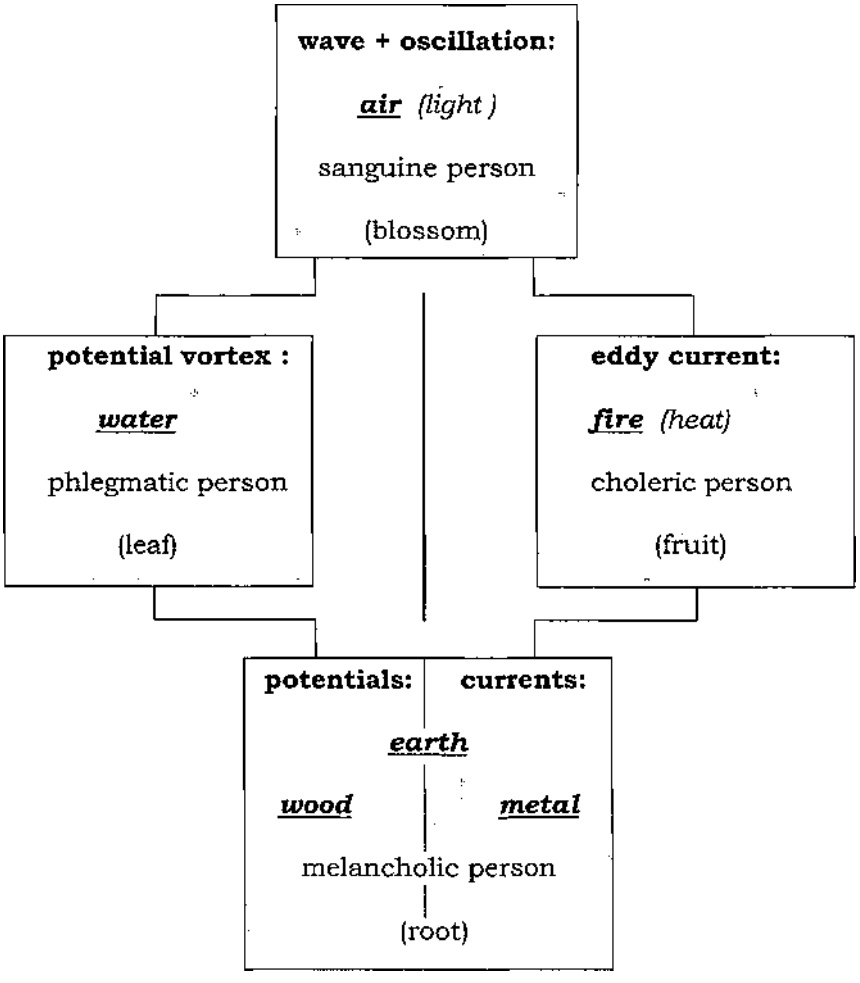


Fig. 8.9: The theory of four elements of the old Greek philosophy of nature (Aristotle and others)

8.9 Philosophy of nature

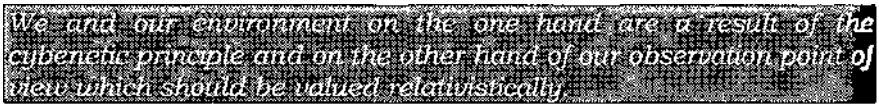
Seen in the view of the philosophy of nature now two dual points of view are possible.
The optimistic one would be:
We and our environment on the one hand are a result of the cybernetic principle and on the other hand of our observation point of view which should be valued relativistically. If really everything should be electromagnetism, a phenomenon which can't be grasped directly by humans, then the pessimist would come to the conclusion: everythins is nothing. What we observe is nothins but a deception of the senses. Perhaps therefore famous philosophers of antiquity, like Empedokles or Demokritos have ended their life in the crater of the Etna. According to the theory of the atom of Demokritos (470 to 380 B.C.) the formation of matter, earth and celestial bodies will occur by means of formation of vortices!
Empedokles (482 to 420 B.C.) was the first to develop a theory basing on four elements, which was continued and improved by Plato (428 to 348 B.C.) and Aristotle (384 to 322 B.C.). Accordingly these elements are changeable into each other and mixable with each other. From them all bodies are build up.
The terms "air, water, fire and earth", with which the philosophers have described the four elements, are of course not identical with the ones in our translation and conception world, but they were used in a philosophical sense as a substitute for the description of the respective basic principle.
There also have been different approaches, to translate these terms differently, e.g. by an assignment to the four states of matter (solid, liquid, gaseous, plasma). But the ancient texts don't get easier to read in that way.

Fig. 8.9 shows the obvious assignment to the four building parts of the fundamental field equation 5.7. It would be worth an attempt, to exchange the terms in the translations of ancient texts and to translate air with wave, water with potential vortex and fire with eddy current. The term earth has two sides, which should be translated with potential instead of wood and current instead of metal.

Let's try the translation this way with the theory of Plato<i>, by correspondingly translating anew the talk of Timaios about the formation of the world. The perception of smell then is described as follows: "...as the potential vortex turns into waves (or) the wave into potential vortices, the smells are formed during this transition, and smells are smoke or fog. But fog is the transition of waves into vortices, the transition of the vortex into waves however smoke".
Plato here provides an indisputable and conclusive interpretation of the fundamental field equation. In this equation the potential vortex acts as damping term in the wave equation, what in the case of waves rolling up to vortices will show to the observer in the way that the electromagnetic waves and therefore also the light will be damped. We say, the visibility gets worse and speak of fog. If the damping phenomenon disappears again, as the potential vortices break up, then Plato speaks of smoke.
Numerous ancient texts, which until now only could be "interpreted" philosophically, in this way turn out to be a rational textbook description of natural scientific phenomena. They anyway only get readable and understandable for the general public with the modern technical terms.

<i>: Platon: Samtliche Werke 5, Rowohlts Klassiker Nr. 47, S. 188, 66e

Optimist:


We and our environment on the one hand are a result of the
cybenetic principle and on the other hand of our observation point of
view which should be valued relativistically.

Pessimist:

Plato<i> (talk of Timaios about the formation of the world) description concerning the perception of smell:

"...as water (the potential vortex) turns into air (waves) or air (the wave) into water (potential vortices), the smells are formed during this transition, and smells are smoke or fog. But fog is the transition of air (waves) into water (vortices), the transition of water (vortex) into air (waves) however smoke"

changed translation with the technical terms:

air_____ = ____wave
water = ___ potential vortex
fire_____ = ____ eddy current

As a consequence:

smell is vortex information

Fig. 9.0: The explanation of Plato concerning the formation of smell, smoke and fog<i>

<i>: Platon: Samtliche Werke 5, Rohwohlts Klassiker Nr. 47, S. 188, 66e

9. Usage

If the newly discovered vortex phenomenon of the vortex of the electric field exists, then it will be possible to practically use it. Whereas we still think about possibilities for technical usage, there by all means exists the possibility, that nature already is successfully using the vortex for a long time. We should look precise at things. We can only learn of nature!

Remarkable about the passage of Plato (fig. 9.0) is not only the fact, that the potential vortex already was known for two and a half thousand years and was taken into consideration for an interpretation, but also the realization of Plato, that during the described transition the smells form. Smell thus would be a vortex property!

After all vortices are able to bind information as can be inferred from the basic principle of cybernetics. With this vortex property and the statement of Plato smell obviously would be nothing else than pure information which by potential vortices is stored, distributed and eventually is caught by the hair cells for smell of the nose.
If now a dog takes up a track, does it then run after vortices which remained behind or does it analyse, according to the encyclopaedia, the chemistry left behind, or does it combine both? Does the bloodhound for instance interpret the vortical oscillations of chemical substances like lattice oscillations or the movements of the electrons in the atomic hull? A lot of work awaits the research scientist of vortices here. The seminar will offer opportunity, to deepen this topic<i>.

Only if technicians exist, who put an electronic box on the table with a button, at which they adjust the wanted scent of rotten eggs to lavender, we honestly can claim to have understood the phenomenon of the smell.

For the majority of the people a theory only wins its sense by the practical applicability, and therefore we'll have to develop and present a technical usage on the basis of the vortex theory.

<i>: Suggestions for appropriate seminar themes: the meaning of smell, taste, the aroma therapy, the homeopathy or the effect of aetheric oils. (To that in part 3, INDEL Verlagsabt. 2003)

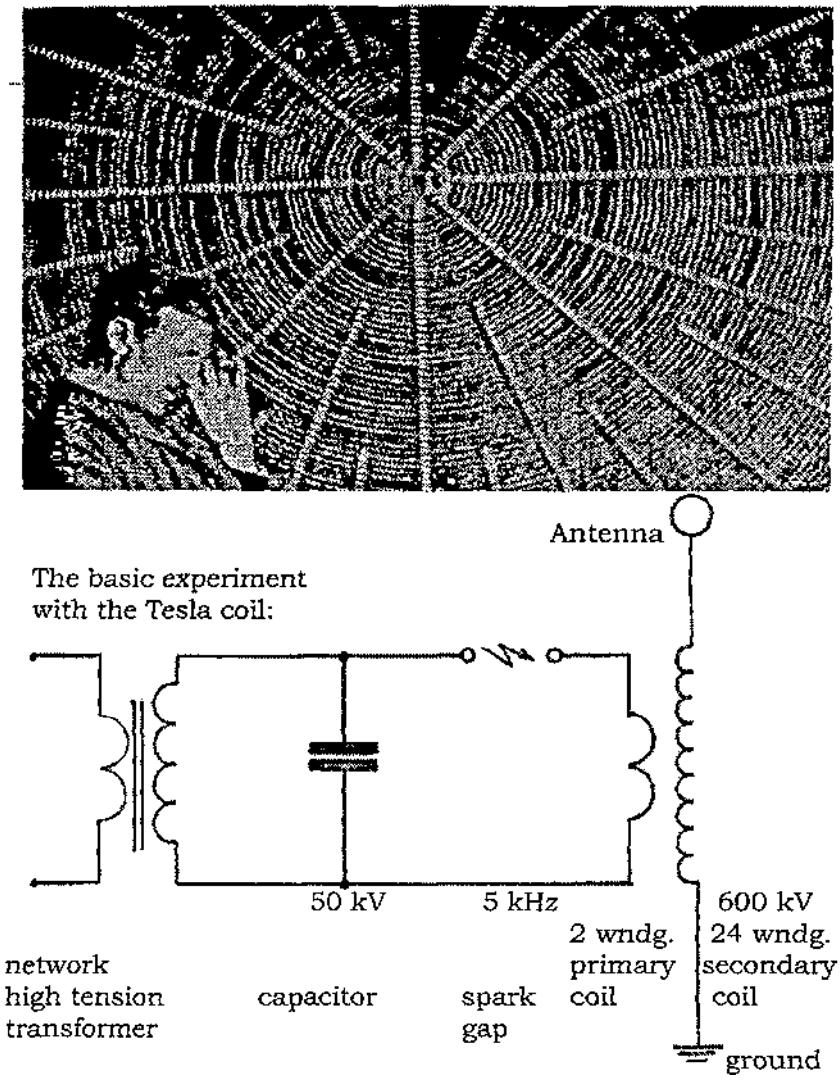


Fig. 9.1: High tension transmitter of Nikola Tesla

9.1 Longitudinal electric waves

It is important, that experts struggle for problem solutions. Only if the discussion about limits doesn't come to a result which can be grasped and verified, then also in the environmental compatibility the willingness will grow, to accept a not yet known phenomenon as a further and possibly crucial influential factor.
Already for a hundred years there has been a dispute of experts. At that time scientists all over the world were trying to verify the experiments of Heinrich Hertz. Then from America the message came, Hertz had been mistaken and the electromagnetic wave would have completely other properties. The scientists in Europe were indignant, but they had to take the message seriously, because it after all came from the important experimental physicist Nikola Tesla (1856-1943), who with his inventions of the rotary field and of the asynchronous motor has stamped today's electric energy technology as no other.

As a result Lord Kelvin boarded a steamship as a mediator and sailed 1897 to New York to convince Tesla from the opposite. But the experiments, which Tesla presented his Lordship, didn't give rise to any doubts<i>, and thus Kelvin returned to Europe with the message: "Both are right, Tesla as well as Hertz! Whereas the electromagnetic wave which Hertz has detected, is a transverse wave, does Tesla work with a longitudinal wave"!
Lord Kelvin as a result started to draw most different vortex models, because it was clear to him, that a propagation as a longitudinal standing wave analogous to the sound wave only is conceivable, if quantized structures exist, which knock each other mutually. Kelvin therefore assumed vortex structures of the electromagnetic field. His vortex models were published and landed in the curiosity box of orthodox science.
Heinrich Hertz did have a big advantage. He could refer to Maxwell and calculate his wave with the field equations. For modern technology the mathematical calculability is almost an indispensable prerequisite!
For Tesla wave there however neither was a mathematical nor a physical theory. The only thing Tesla had, were presentable experiments.
In Colorado Springs he had build a 10 kW transmitting installation and lighted 200 fluorescent lamps of 50 Watt each on a mountain in the Rocky Mountains in a distance of 25 miles. With that he had completely transmitted the transmission power of 10 kW, as can be inferred from the press reports at that time. With Hertzian waves, which propagate spatially, this experiment even today, after over 100 years, wouldn't be realizable technologically. According to the law of the square of the distance one isn't even able to let glow a tiny little lamp in such a distance.

For sure his rotary field theory was a big help for Tesla in all experiments. Actually a rotary field can be seen as the special case of a planar vortex.
Thus Tesla obviously was able, to use the potential vortex without even knowing it. Tesla has stimulated a loosely coupled high tension coil wound like a spiral to self-resonant oscillations and emitted the produced vortices over an antenna (fig. 9.1). On the receiver side the process was then reversed.

<i>: N. Tesla: III. The Singular Misconception of the Wireless (Famos Scientific Illusions), Electrical Experimenter, Feb. 1919, p. 732.

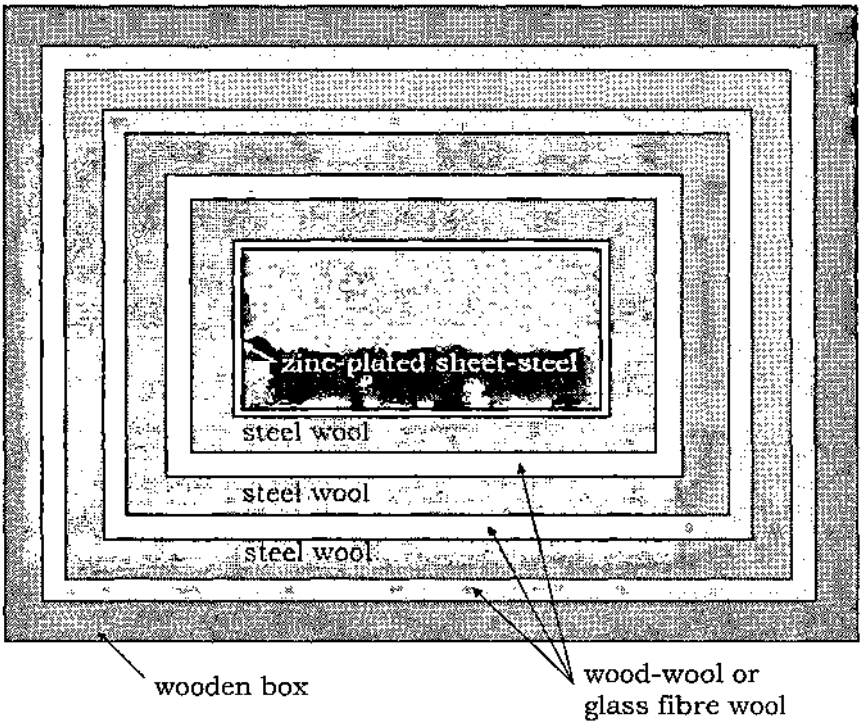


Fig. 9.2: Orgone accumulator according to Wilhelm Reich.[<i>]

<i>: Dr. James DeMeo: The Orgone Accumulator Handbook, ISBN 0-9261855-0-7

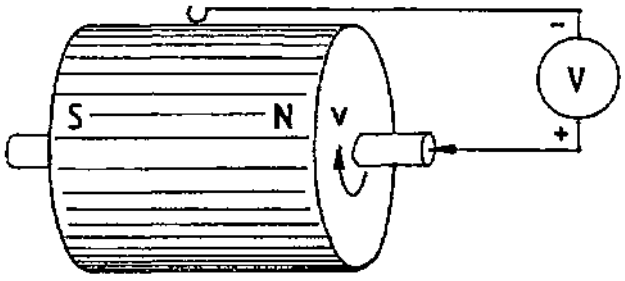
9.2 Medical technical usage

Nikola Tesla at his time was extremely popular in the area of medicine. With his inventions injuries were cured and pain eased. Modern diathermy goes back to his work. But Tesla at that time has treated the patients with vortices, whereas today, possibly out of ignorance, electromagnetic waves are used. These however have in contrast to potential vortices only a small penetration depth. Today in addition only the effect of heat is considered and in no way the information technical effect of electric vortices. Here we are missing the comparison, to be able to say. if the treatment with a Tesla apparatus was more successful than with modem microwave radiators.

The experiments of Wilhelm Reich (1897-1957) aimed in the same direction. Exactly as Tesla 55 years before also Reich emigrated to America in 1939. He had specialized in catching and collecting vortices, which he called "orgone", from the air. In this way he could store up high energies over time and then use them purposeful. With his "orgone accumulator" he was able to cure wounds faster and to ease pain. He also treated cancer and a lot of forms of anaemia. Technically Reich could demonstrate, that charged capacitor plates discharge faster under the influence of his apparatus. His orgone accumulator for instance is a wooden box, filled with wool of steel and wood, which alternate in layers. He said that the reason for this construction is, that metals repel the orgone energy, whereas organic materials become charged and accumulate it. That holds in his opinion to a particularly high degree for water.
Reich concludes that no material and no device are known, with which the orgone energy could be shielded. This with regard to the environmental compatibility of the vortex phenomenon should make us thoughtful.
As a supplement it should be mentioned, that Reich already at the end of the forties has pointed to the dying of the forests and he has made a direct connection to the orgone energy. Reich was slandered and mocked and died in the prison of Connecticut, while his writings were burned publicly.

Not much better fared the Austrian forester Viktor Schauberger (1885-1958), who also can be described as visionary. He was able to produce water with a particularly good conductivity. His water in addition goes for medicinal and healthy. Also to him travelled cancer patients of far away to get this water.
Schauberger spoke of the natural treatment of the water, whatever he meant with that. In any case he build with great success installations to transport wood by floating it and even installations to mine ore with so-called double twist pipes, which made possible a transport without friction even of materials, which are heavier than the "means of transport" water. It could be proven that no contact with the pipe took place. This was scientifically investigated and confirmed at the university of Stuttgart 1952 by Prof. Popel. Quite obviously in the double twist pipe vortices have formed, which have bound the material to be transported (see phenomenon of transport).
Today you can buy levitated water at over 100 selling points in Europe, of which is claimed, that it is prepared according to instructions of Schauberger. Unfortunately we aren't able to ask him anymore, if he agrees with such a "centrifuged" water. Thus the test of the effectiveness has to be left to everyone himself or herself.

A: Concerning the functioning of the Faraday generator ($E = v \times B$):



B: Construction of the flying disc:

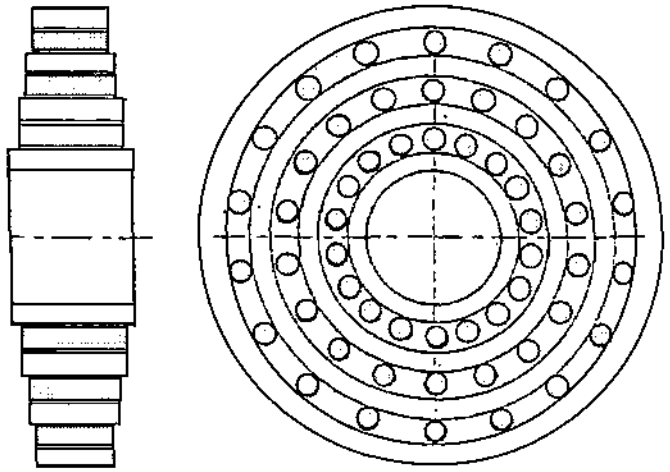


Fig. 9.3: Applications of the Faraday generator<i> in the flying disc of Prof. John Searl

9.3 Flying objects

The medium of Viktor Schauberger always was the water. He could produce light effects and very high temperatures with it with only minimal excitation in the form of impulses. An installation, which had been built according to his plans at the company of Siemens, eventually melted at 4000°C by improper operation, as he himself stated. According to that the machine would have released more energy than used, thus a perpetuum mobile. The authorities of the state in the Third Reich were impressed and put Schauberger in a concentration camp, where he was instructed to build a "flying saucer" under permanent supervision together with fellow prisoners. For him it's all about the concentration effect and the usage of the as a result occurring implosion in contrast to our today's " technology of explosion and fire" as Schauberger was accustomed to express himself. It is not known, if Schaubergers "repulsine" ever has took off.

A disc, which has proven its suitability to fly, was constructed and built by the english technician John R. R. Searl, although he said he can't explain the effect. He also had big difficulties, to get the apparatus under control. A disc broke through the ceiling and the roof of his laboratory and disappeared to never be seen again. Five other flying discs, which he after this experience started in the open, went lost in the same manner. Without knowing the effect, he of course neither could assess the dangers. His experiments have claimed serious injuries and a casualty. While he 1985 was put in prison under a pretext, his laboratory and his house were burned down and all documents destroyed. Now he works on a technical usage. According to the principle it concerns a Faraday machine. Thereby a permanent magnet, magnetized in axial direction, is turned. Now the magnetic induction B for a relative velocity v is measured as an electric field strength E according to equation 6.10: $E = v \times B$. (6.10)

Because the vectors are arranged as standing perpendicular to each other, will arise a tension voltage in radial direction (direction of E-field) which can be taken off. Apart from the friction no further force of reaction occurs in the case of the Faraday generator. Because of the small gain of energy until today no application ready for the market exists. But this principle, to convert magnetic field energy into electric, already has moved the nature of many inventors. Professor Searl has reversed this old principle. Whereas normally the component of the velocity towards the centre of rotation decreases, it increases in Searls case. For that he works with roller pivoted concentric rings, which he drives by a small electric motor (fig. 9.3). Doing so something inexplicable for him happens: After switching off the motor the revolutions per minute don't decrease again, but increase audibly and increase further, until the produced electric field shows the well-known high tension phenomena: corona discharges, formation of ozone, ionisation of the air and production of a vacuum in the inside of the disc.

The rings and rollers consist of several layers, which are built up similar to a bi-metal. The only explanation I can think of is that a change in structure would occur as a result of the physical length contraction which is caused by the increase of the E-field in the direction of the centre of rotation. The bi-metals try to withdraw themselves from this change by an increase of their rotation of their own (fig. 6.5). To compensate the field the disc builds up a spin, as also the elementary particles do (fig. 6.13). While the formation of vacuum prevents sparking in the inside of the flying disc, and the revolutions per minute further increase because there is no air friction whatsoever, the disc weighing 5 tons all of a sudden lakes off the ground and according to reports of eyewitnesses shoots vertically upwards.

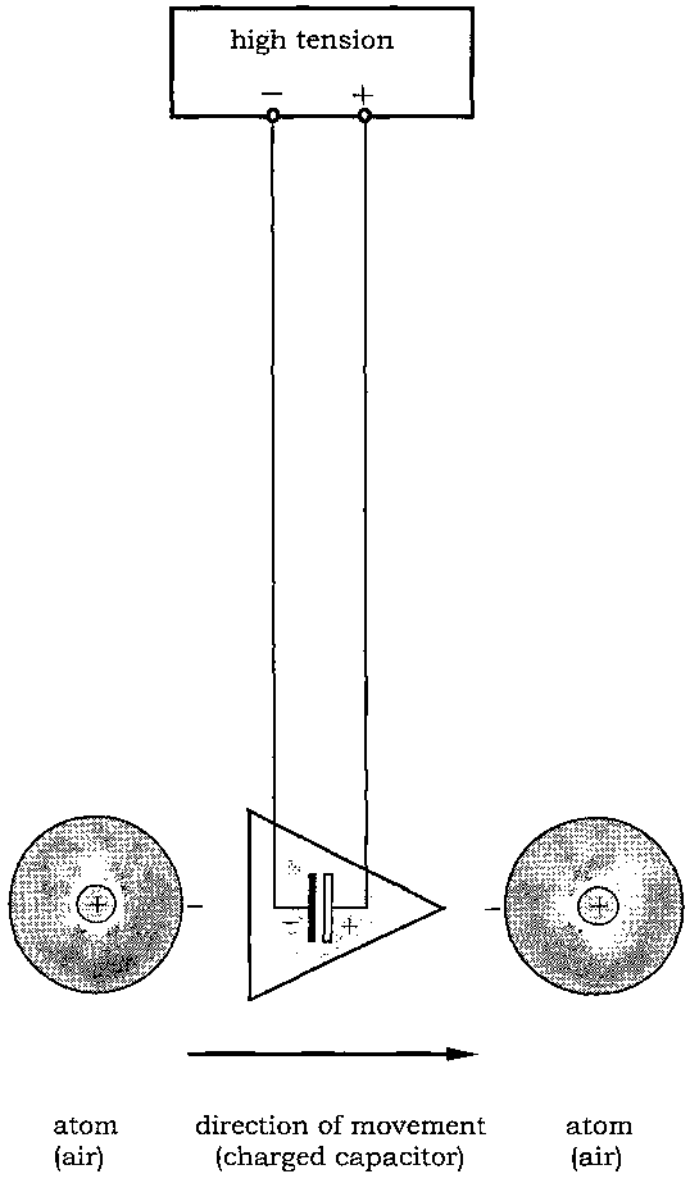


Fig. 9.4: Capacitor experiment concerning the so-called electro-
gravitation according to Prof. Biefeld / Dr. Brown

9.4 Electro gravitation?

Wild speculations circulate about the mechanism of the flight of a "flying saucer", which should function without sound and without combustion, and for which no sound barrier exists, as pilots have observed. The talk is about cancelling gravitation or about an "electro gravitation".
Reproducible in any case is an experiment, which has been systematically investigated by the american professor Biefeld and his pupil T. Brown from 1925. Accordingly does a body charged to high tension show a force effect in the direction of its positively charged note. As a check for oneself a capacitor can be suspended on its connection wires and it can be observed, how it moves visibly in the direction of the positive pole in case it is charged (fig. 9.4).
Because the Biefeld-Brown effect depends on direction, it actually can't concern gravitation at all but merely a not understood electromagnetic interaction. In the neighbourhood of the capacitor pole air molecules are found, and their negatively charged atomic hull is attracted by the positive pole. At the same time the atomic nucleus is repelled. By that the air atoms in the presence of the high tension capacitor become unsymmetrical, causing the force of attraction due to the smaller distance to exceed the force of repulsion. At the negatively charged end the conditions are exactly reversed. There a repulsion occurs. Because the polarized air atoms and molecules are sucked in, no pressure can build up and as a result no sound barrier can occur. Experiments with charged and uncharged rockets have brought the interesting result, that the electrically charged rockets flew many times as far as the uncharged ones (5-6 times as high)<i>.
Many a person now perhaps starts to dream of the flying carpet but, as said, it isn't an "effect of antigravitation". Does "free energy" actually exist, we have to ask ourselves? From the gravitation the soviet physicist Landau calculates an energy density of 16 megawatt hours per cubic meter for the earth's surface. Immediately inventors are found, who want to use this gravitational energy.

Nikola Tesla in his laboratory in Manhattan has incidentally built resonators, of which he could bring all electric, magnetic and mechanic factors in resonance. On an evening stroll he fastened a battery operated vibrator to the tubular steel scaffolding of a new building and let everything shake and wobble. In his laboratory such a device once got out of control by inattentiveness and triggered an earthquake. In that way the road surfacing and pipes were burst and window panes got broken. The police penetrating his laboratory only could see, how Tesla forcible finished the experiment with a sledge-hammer.
The experiments which got out of control of Tesla, Searl and Schauberger have one thing in common: it concerns constructions with an unipolar arrangement of the field.
Tesla had arranged the magnetic field in a unipolar way, as he has reported himself, Searl had realized electric unipolar fields in a construction similar to the electron, and Viktor Schauberger had specialized in producing unipolar structures with water vortices.
In the case of the corresponding technical usage, which can be interpreted as making use of the occurring "spin coupling", therefore in principle utmost caution is imperative.

<i>: Rho Sigma (Dr. Rolf Schaffranke): Forschung in Fesseln, das Ratsel der Elektro-Gravitation, Ventla-Verlag, Wiesbaden, 1972, Page 67.

Nikola Tesla: ,,Ere many generations pass our machinery will be driven by power obtainable at any point in the Universe This idea is not new, we find it in the marvellous myths of Antheus, who derives energy from the earth... Everywhere in the universe there is energy. Is this energy static or kinetic? If static, our hopes are in vain; if kinetic, and this we know it is for certain, then it is a more question of time when men will succeed in attaching their machinery to the very wheel work of nature". New York, the 20th may 1891, American Institute of Electrical Engineers.

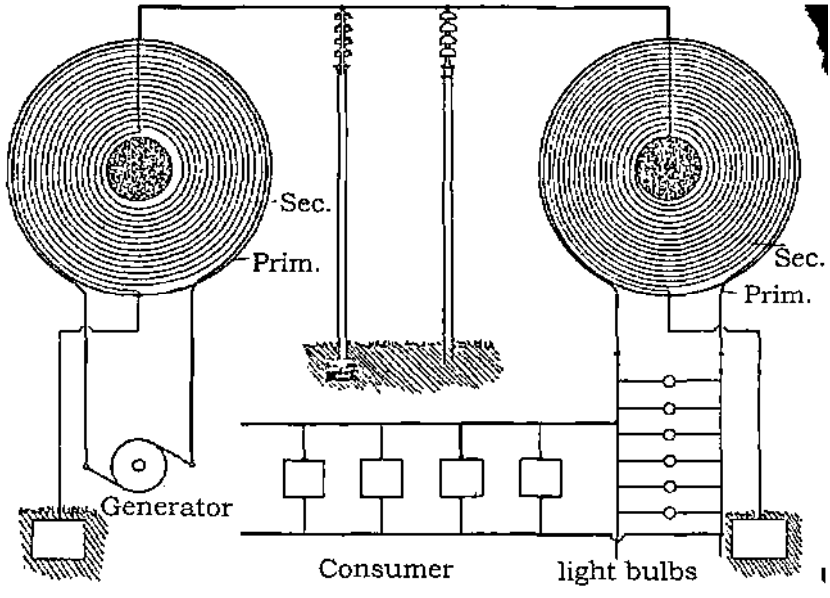


Fig. 9.5: Energy transmission bound to a wire, Patent No. 593,138 (1897) of Tesla.

<i>: Philadelphia Public Ledger, Nov. 2, 1933
<ii>: Dr. Nikola Tesla: Complete Patents, Tesla Book Company, New Edition 1983, Compiled by J. T. Ratzlaff, ISBN 0-960356-8-2, page 301-304.

9.5 Free energy?

Furthermore is reported of Tesla, he would have developed a "converter for space energy" and 1931 have built it in a luxury car (Pierce Arrow)<i>. The car was a 145 km/h fast, doing so the asynchronous motor (presumably built by Westinghouse) furnished 80 HP at 1800 Rpm. The "free energy" the converter, build by Tesla himself, got from a 1.8 m long antenna. Because the motor ran without adaptation of frequency in slipping operation, it had to be cooled correspondingly. It was on the way in trial run for over a week. Now we of course want to know, of what this "free energy" consists, which Tesla will have used and of which he already 1891 had spoken in the American Institute of Electrical Engineers.

For the electron as a spherical vortex we have calculated an electric tension voltage of 511 kV between its surface and its centre respectively infinity (equation 6.31*, fig. 7.1). The highest level of tension voltage normally used for the high tension transmission lies at 380 kV (effective value); for a direct current transmission it is 500 kV. Although still higher tension voltages would be desirable, they are avoided. This is no accident. Experiments with higher tension voltages namely have resulted in inexplicable high losses. We have an explanation: the electrons are taken apart on the way! Their inner energy amounts with the outer energy to zero. The charge carrier, which in the power station as result of an energy conversion has been sent on a journey, is in danger to vanish into thin air (e.g. corona) for tension voltages above 511 kV. The transmitter of Nikola Tesla however (fig. 9.1 and 9.5) worked with 600 kV and more. He said, with his experiments he had destroyed billions of particles without being able to observe an emission of energy and made fun of the misinterpretation of Einstein of the already at that time well-known mass-energy relation $E = mc^2$.

For the purpose of a one wire or a wireless energy transmission the tension voltage therefore has to be higher than 511 kV. With Teslas equipment however the electrons shouldn't be destroyed, but merely be pulled apart to plane circular vortices with help of the today is Tesla coil known winding. These then could be sent on a journey over the antenna, to again be caught and formed back in spherical electrons by the receiver antenna. As long as the electrons don't fall apart, they keep their structure and quantum property. Quanta pass on an excitation, for instance a bump, in form of a longitudinal standing wave, by one particle bumping the neighbouring particle, analogous to sound waves, where one gas molecule passes the bump on to the neighbour. The transmission hence takes place as longitudinal scalar wave.

Electrons pulled apart to planar vortices in addition haven't got a closed vortex centre anymore on their journey. For the by Tesla in his laboratory used and publicly presented one wire energy transmission (1897, Patent Nr. 593,138) the transmission hence doesn't take place in the wire, but as vortices around the -wire. That explains, why only a relatively thin conductor, which normally should have melted, was necessary for a demonstrated power transmission of 10 kW. Tesla however could show, that the wire stayed cold and virtually no heating losses were measurable<ii> (fig. 9.5). He himself said, that this one wire transmission technology is much better than the alternating current technology full of losses, which stems from him as well. Tesla must have known the limit of 511 kV very exactly, because on several photographs one can see, that he changed the coiling technique off this value!

<i>: Philadelphia Public Ledger, Nov. 2, 1933

<ii>: resp. Tesla's lost inventions, VAP, page 36 and page 48, 49.

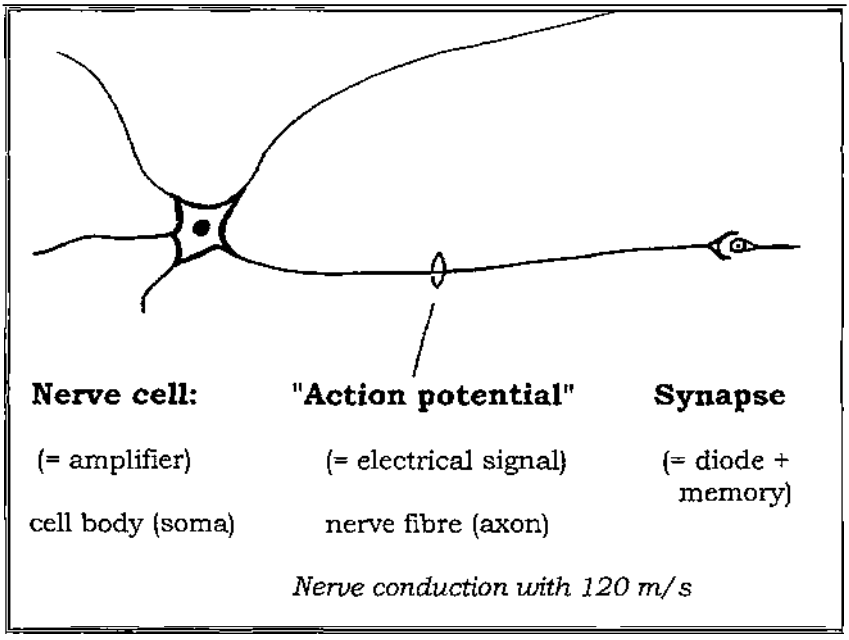


Fig. 9.6: Nerve cell and message processing (neurons)

- Material information conduction: at plants
- Information conduction with hormones: at simple animals
  - Electrical information conduction: at higher developed creatures
    - Analog transmission: from 10% and more difference in potential, and
- Digital transmission: number of the action potentials
- Modulated information: i.e. complex modulation of the action potential (the potential vortices)

9.6 Nerve conduction and action potential

Technical solutions often are only a suboptimum and many times they are anything but an optimum. In many cases the feasibility stands in the foreground. In the question of the current distribution at that time the decision was made for the worse system, the full of losses three phase system, because no current meters were available for the free of losses one wire technology. Without being able to collect money from the consumer, it wouldn't have been possible for the energy distribution installations to pay for themselves. Compared to that is nature with its selection principle merciless and without compromises. On1y the most efficient system has a chance to survive and to spread. If it's about transmittining information in an electric way and two different principles present themselves, then in nature only the better one will be brought into action.
Let's take a look at the nerve conduction in the human body. In the synapses ion concentrations and electric potentials of 70 to 90 mV arise. Here with conventional gauges the activity of a nerve can be detected. From a measurement of the transmission time of synapse to synapse the velocity of the signal is determined. If we however want to measure between the switch points on the line, then we have to find out, that for instance with an ammeter actually nothing is measurable. In addition the nerve fibre has a miserable conductivity.
The biologist calls the electric signal just "action potential" and draws a vortex-like ring around the nerve fibre and speaks of a mixed digital and analogue information transmission.
The doctor on the other hand knows two different types, fast and slow nerves. In the inside both are built up virtually identical. A characteristic difference consists of the fact, that the fast nerves are jacketed with a thick fat layer.
The technician would say, they are better isolated, but why they therefore should be faster, he hardly would be able to answer. If we however assume, that the action potentials or OUT potential vortices oscillate around the conductor, thus exactly in the isolation layer and are forwarded there, then possibly an explanation would have been found.
The nerve conduction moreover has much in common with the one wire system of Tesla:

1. Charges and electric potentials are transmitted
2. Doing so a transport of charge carriers, thus an electric current on the line, isn 't detectable.
3. Consequently no losses worth mentioning occur.
4. Decisive for the functioning is the dielectric insulator material which surrounds the conductor and not the electric resistance of the conductor.
5. In contrast to electric circuits a draining conductor is unnecessary.

It looks as if the one wire system is not new at all, as would nature use it already for ages in the highest perfection. We realize immediately, why our head does without a ventilator and how the high of signal processing density can be explained. Compared with our brain modern personal computer (PC) with their backward cable technology are far less than a suboptimum.

With regard to the pressure on the environment by interference radiation we had derived, that currents and eddy currents with the skin effect direct their radiation to the outside, whereas potential vortices with their concentration effect direct it to the inside. Probably for this reason the radiation field of a person is environmentally better compatible than that of a PC.

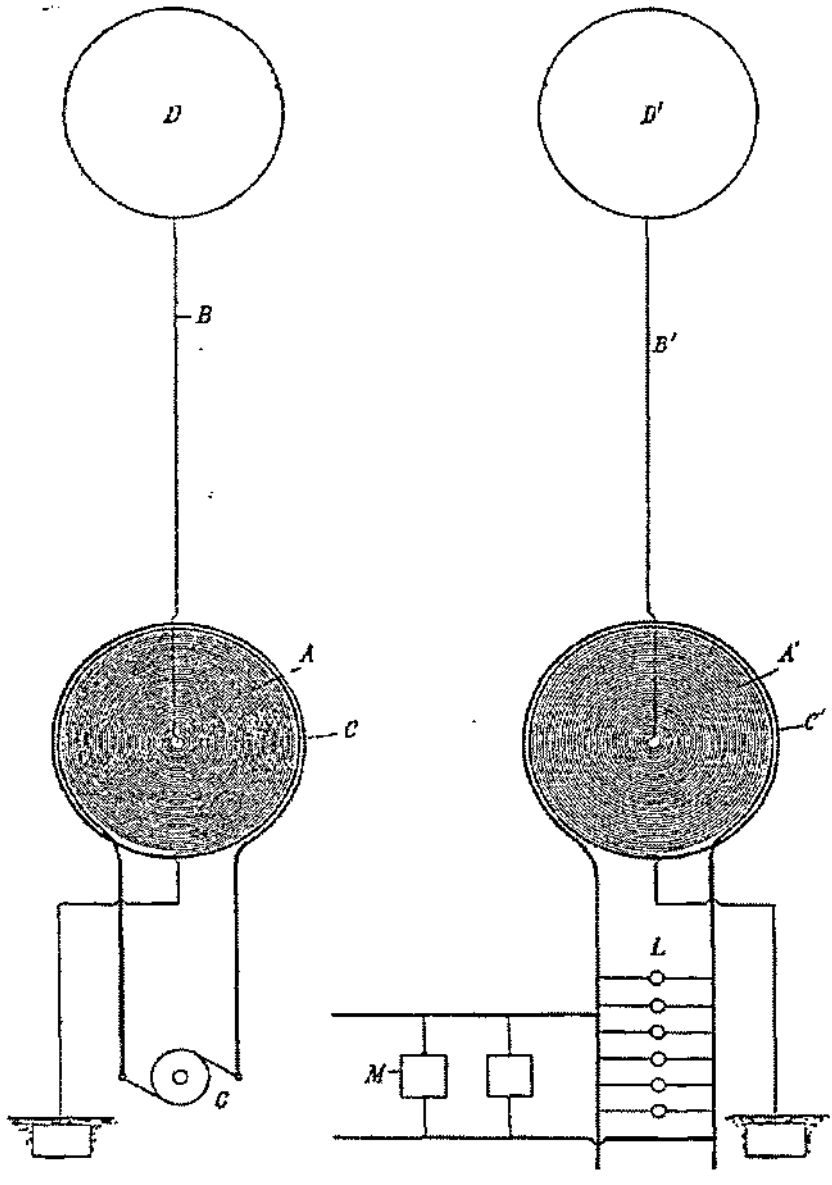


Fig. 9.7: Wireless energy transmission, Patent No. 645,576 (1900) of Testa.<i>

<i>: Dr. Nikola Tesla: Complete Patents, Tesla Book Company, page 311-321.

9.7 Wireless energy transmission technology

Tesla still went a step further. He has cut the wire connection between transmitter and receiver (fig. 9.5) and instead has installed each time a spherical electrode (fig. 9.7). With this facility he now was able, to transmit energy completely wireless (1900, Patent No. 645,576). Building on this principle Tesla already 1890 had built a radio remote control for a battery operated submarine and had presented his patented system the navy. But they weren't able, to recognize the strategic importance of the radio technology and rejected with the words: "It's too advanced!" (fig. 9.8).

Tesla further had proven with this technology the mentioned proof concerning the existence of longitudinal electromagnetic waves. There exist descriptions, partly of Tesla himself, how he, inside or also outside his laboratory, goes in search of oscillation nodes of the standing wave with a measuring receiver[<i>].
He names several conditions for the wireless energy transmission:

1. "perfect resonance" (same frequency) of transmitter and receiver
2. Installation of the receiver on an "oscillation node" (maximum).

Important is also the measurement of the velocity of propagation, and that isn't constant from the start for a wave, which oscillates in the direction of propagation. From the research of earthquakes we know, that the longitudinal waves are faster than the as well occurring transverse waves. Usually the distance to the epicentre is determined from the difference in transmission time.
In the patent specification the measurement is described[<i>]. Tesla has sent longitudinal radio signals from his transmitter in Colorado Springs once around the earth along the earth's surface and determined a transmission time of 0,08484 seconds. This corresponds to a frequency of approx. 6 Hz. He saw his result confirmed, as he could find the oscillation node of the standing wave again (according to $\lambda/2$) in his laboratory (on the ground plate).
For the full wave length λ the Schumann resonance, which describes a standing wave of an around the earth running Hertzian wave, lies as is well-known at 7.8 Hz! Tesla calculates for his wave a speed 1.6 times the speed of light assuming the polar radius of the earth to be 6363 km.
Also this measurement result confirms, that Tesla didn't use the Hertzian wave. Tesla found the off-beat concept of Einstein, the speed of light would be the fastest possible velocity of signal transmission, only funny. If however today is claimed, 1993 in tunnelling experiments for the first time a speed faster than light has been measured, then this just isn't true. Possibly also the Tesla wave tunnelled, as the vortices for a small conductivity of the air contract and as a result of the length contraction become correspondingly fast.
Later Tesla after several goes in vain even succeeded in building a high tension tube as a tunnel, with which the velocity of the signal could be increased arbitrarily. Tesla with that pursued the goal to be able to make radio contact with other worlds[<ii>].

<i>: N.Tesla: Art of Transmitting Electrical Energy Through the Natural Mediums, US-Patent No. 787,412, 18.4.1905, Complete Patents pp. 397-402.
<ii>: M. Cheney: Tesla, Man out of Time, Barnes & Noble Books, New York, 1993, und S. 309, Omega-Verlag, 1996, ISBN 3-930243-01-6

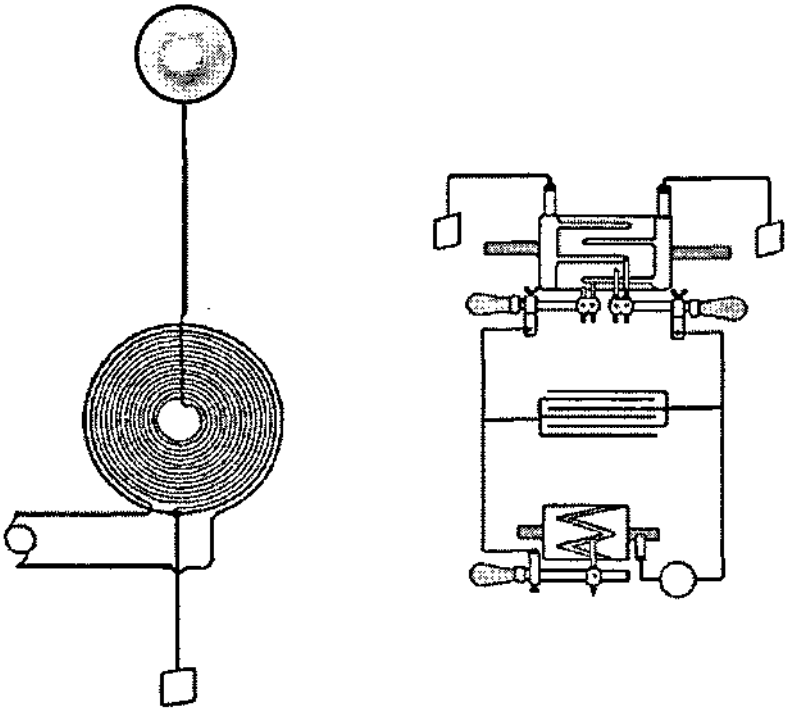
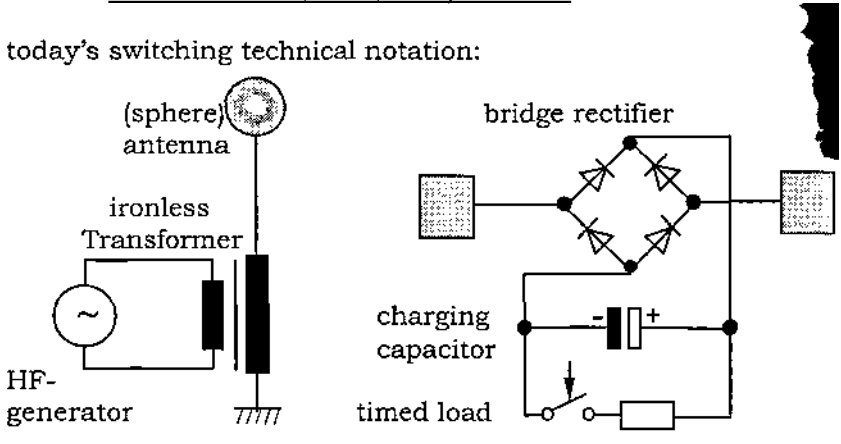


Fig. 9.8: Energy wave broadcasting system, Patent No. 787, 412 (1900) of Tesla.

In today's switching technical notation:



9.8 Measuring and switching technique of Nikola Tesla

As an important and accepted experimental physicist with 14 doctor titles and carrier of the Edison medal Tesla always has held on to his measurement results. Not a theoretical interpretation but exclusively correct carried out measurements have shown him the physical reality. But the by Tesla won measurement results were already for 100 years hard to digest and couldn't be brought into accord with any theory. Therefore a switching technical analysis of the by Tesla described and carried out experiments should give us now information over the nature of the free energy, the tachyon energy, the orgone, or however fantastic the terms may read.
The Tesla coil, according to the instructions of the inventor, is a flat coil wound like a spiral in contrast to the copies today on sale which, surely out of ignorance, are mostly cylindrical. Its peculiarity probably is to be seen in the circumstance, that charges moved through the wire of the coil inevitably increase their angular velocity towards the centre, In this way the electrons, which at first are spherical elementary vortices, are pulled apart to vortex rings like planar discs.
Tesla switches the "secondary" called flat coil between two "terminals". Following he sends, stimulated by his "primary", charge carriers from one terminal to the other and back again and produces a standing resonant oscillation.

Mostly replaces Tesla one of both terminals by the earth. He thus assumes, that now the earth as a spherical electrode takes over the function of one terminal. That he again infers from the observation, that a by the transmitter wireless fed little lamp goes out, if he cuts the connection to the ground. Doing so the oscillation collapses. Radio sets on the other hand can also be operated without grounding, as we know!
The degree of effectiveness of today's distribution technology of current due to the heating losses lies clearly beneath 100 per cent. Without the losses of the wiring it lies close to 100 per cent for the discussed one wire energy transmission. There the vortex rings are guided nicely one after another along the line like beads drawn over a string. This result even is to be expected, as far as no vortex "jumps off the wire or "falls apart". For the wireless version Tesla however to his own surprise had to find out that more energy could be received, than his transmitter produced. The measured degree of effectiveness lay above 100 per cent! He therefore called his transmitter a "Magnifying Transmitter" (fig. 9.10). The further transmitter and receiver were away of each other, the further the received energy increased. Tesla inferred from this, that there had to exist free energy and that he had caught that too.

Consequently he had built a receiver for free energy and registered for patent (1901, Patent No. 685,957, fig. 9.9). Tesla states that the amount of energy depends on the size of the "terminal". Of today's sight we could be willing, to describe this receiver plate as a solar panel, but we should know, that the apparatus produced energy even at night! In addition the energy gain was considerable higher than for today's solar panels. Tesla spoke of "radiations ", of an unknown radiation and he in his lifetime has in vain sought-for help of explanation.
The vortex model will also in this question be a valuable help to us.

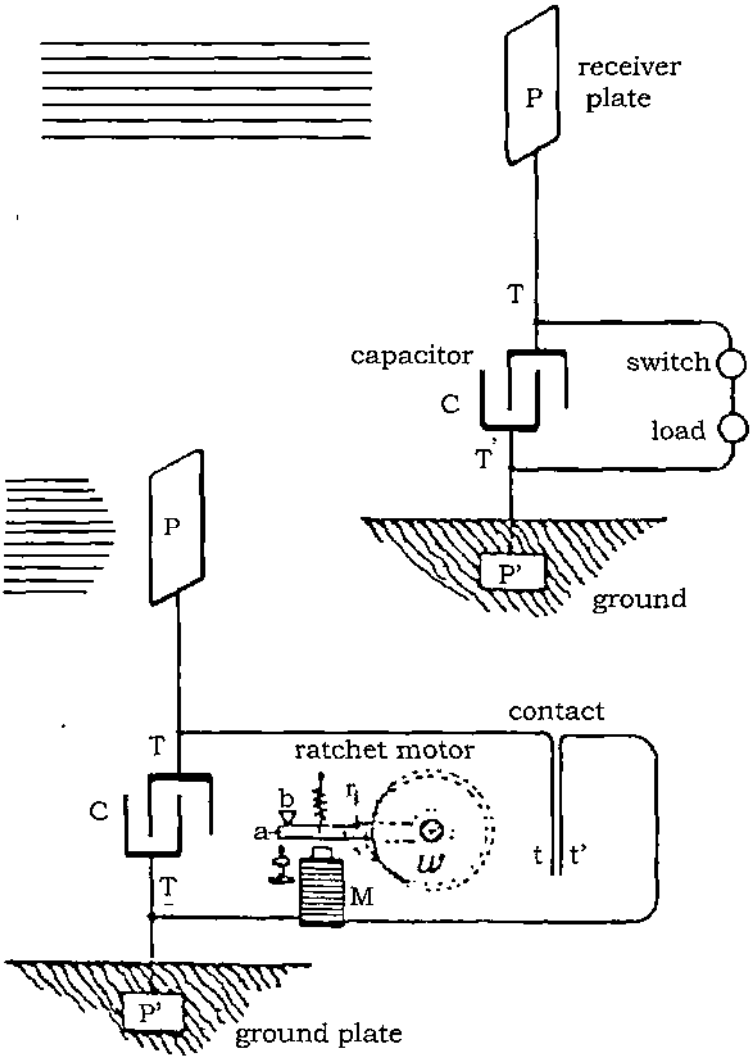


Fig. 9.9: Receiver for "free energy",
Patent No. 685,957 (1901) of Tesla

9.9 Energy technical usage

The answer of the potential vortex theory could turn out as follows:
If at the transition of the one wire to the wireless transmission the ring-like vortices is purloined the guiding wire the vortices immediately begin to turn around each other, as is observable for flow-technical ring-like vortices,. In this way the ring-like vortex the next moment shows its inside. If it before was an electron vortex (fig. 4.3), then it now shows as positron, if it was negatively charged, then it now is positively charged. Following it oscillates back again, etc. Wit that the ring-like vortex on the average has no measurable charge and no mass, because it alternately forms matter and anti-matter. Without interaction it has an enormous ability of penetration . In physics such particles are called neutrinos.
Tesla thus had, apart from his transmitted energy wave, which turned out to be neutrino radiation, by chance also caught neutrinos which oscillated synchronously.

According to the actual level of knowledge do neutrinos penetrate the earth and appear also on the night side. The order of magnitude in every second amounts to approx. 66 billion neutrinos per square centimetre. It is a true bombardment. If we would be able, to collect and convert all neutrinos, the won energy would be entirely sufficient, to cover the need for energy of the world population (approx. 27 W/m^2). We merely have to materialize them, thus give them mass, charge and the necessary localization. Tesla was able to do that experimentally! Let's record:
The ring-like vortices, which Tesla with his transmitter has sent on a journey as electrons with an open vortex centre, are neutrinos (fig. 7.12). Tesla requests that transmitter and receiver operate in resonance, thus with the same frequency. Under this condition the receiver collects in all oscillating vortices, so that no one is lost.
If the neutrinos for instance are just positively charged when leaving the transmitter electrode, then an electromagnetic force of attraction takes place, if the receiver electrode at the same time is negatively charged. The required operation with the same frequency and opposite phase guarantees that also the next moment, if both, the neutrino and the receiver, have changed their polarity, the electromagnetic attraction is preserved.
It is obvious, that strange neutrinos which fly past and by chance oscillate synchronously are as well attracted. In that way the power collected in the receiver capacitor will increase further and degrees of effectiveness of over 100% are obtainable. Tesla discharges the receiver capacitor timed with the frequency of resonance (fig. 9.9) and points to the difficulty of an exact keeping of the condition of synchronisation.
Tesla indeed did work on a theory of his own, but never published it. The patent office and his lawyers had to proceed from the Maxwell theory, although Tesla knew only too good, that his apparatus in no way could be described with this theory. It therefore can't be excluded, that important facts in his patent specifications haven't been mentioned at all - or even worse - consciously or unconsciously in an inapplicable manner have been explained with the Maxwell theory.
Perhaps this is the more profound reason, why the numerous Tesla imitations don't want to function quite so well. With the new theory there should be some changes, and we should accept the challenge for the sake of humanity.

The transmitter tower of Tesla (57 m high with a spherical electrode of 21 m) for the transmission in multiplex mode of operation (according the inventor) of:

- telephone calls
- telegraph services
- teleprinter services
- radio programmes
- navigation signals
- time signals
- video signal

Fig. 9.10: The planned transmitter Wardencliff of Tesla on Long Island, 7.5 MW (1902).

9.10 Environmental compatibility

We now can summarize the different observations and try to find answers for the in the first chapter raised questions concerning the electromagnetic environmental compatibility.
The by Tesla used longitudinal energy wave is a potential vortex wave in the sense of the vortex model of Kelvin, which we again could identify as neutrino radiation (Dirac).
Also other, partly quite fantastic terms, are known like "radiations" (Tesla), "orgone radiation" (Reich), "tachyons" (Feinberg), "grid radiation" (Hartmann), "bioradiation" or "water veins".
Actually these rays have nothing to do with water as a cause. Water with its high dielectricity however favours and influences the course and the local distribution of the radiation. The maximums of the standing wave considered for themselves result lines in straight as a die in the landscape. Of Tesla is known, that he measuring technically could detect the cross points of the lines, which he called oscillation nodes.
There exist so-called dowsers, who can make these standing waves out even without technical aids. For that they hold a fork in their hands, which suddenly moves over such lines.
Let's remember that the same potential vortices are used at the nerve conduction as reaction potentials to conduct stimuli. If ring-like vortices arrive at a muscle, it contracts without knowing, if the signal was sent from the brain over the spinal cord or picked up from the environment over the fork and the hand.

Thus if the same signals, which we use for the tasks of controlling and thinking, are also produced by technical apparatus, then this touches the question of the environmental compatibility in a direct way. Above extremely strong points of resonance, which are called "geopathic zones", now and then even is warned about "psychotronics", a function trouble of the brain, which can show in a disturbance of the waking consciousness.
A possible explanation would be that the brain is occupied with so much vortices picked up from the outside, that it isn't able anymore to accomplish its actual tasks. For muscle cramps or an inexplicable crash of a PC an correspondingly interpretation would be obvious.
As long as no gauges are available, the highest caution is imperative!

If Tesla had been able to put into operation his transmitter tower for longitudinal waves ("World Telegraphy", Wardenclyffe, Long Island, s. fig. 9.10) with the estimated power of 7.5 Megawatt and thus had been able to realize his dream of a world-wide wireless communication, then this could have had hardly estimable consequences for the health of the world population.
Shortly before the completion of the project, in the year 1905, Tesla without notice let stop all work. He to that never made an explanation to anyone. Officially it was said, his financial backer J. P. Morgan would have withdrawn his financial means. In any case was Tesla financially ruined with this step.
Perhaps also T. A. Edison was behind it, who was his opponent at that time. Edison committed himself engaged for the use of direct current. Against the alternating current, preferred by Tesla, Edison argued with unhealthy risks, and with that he perhaps wasn't so wrong at all.

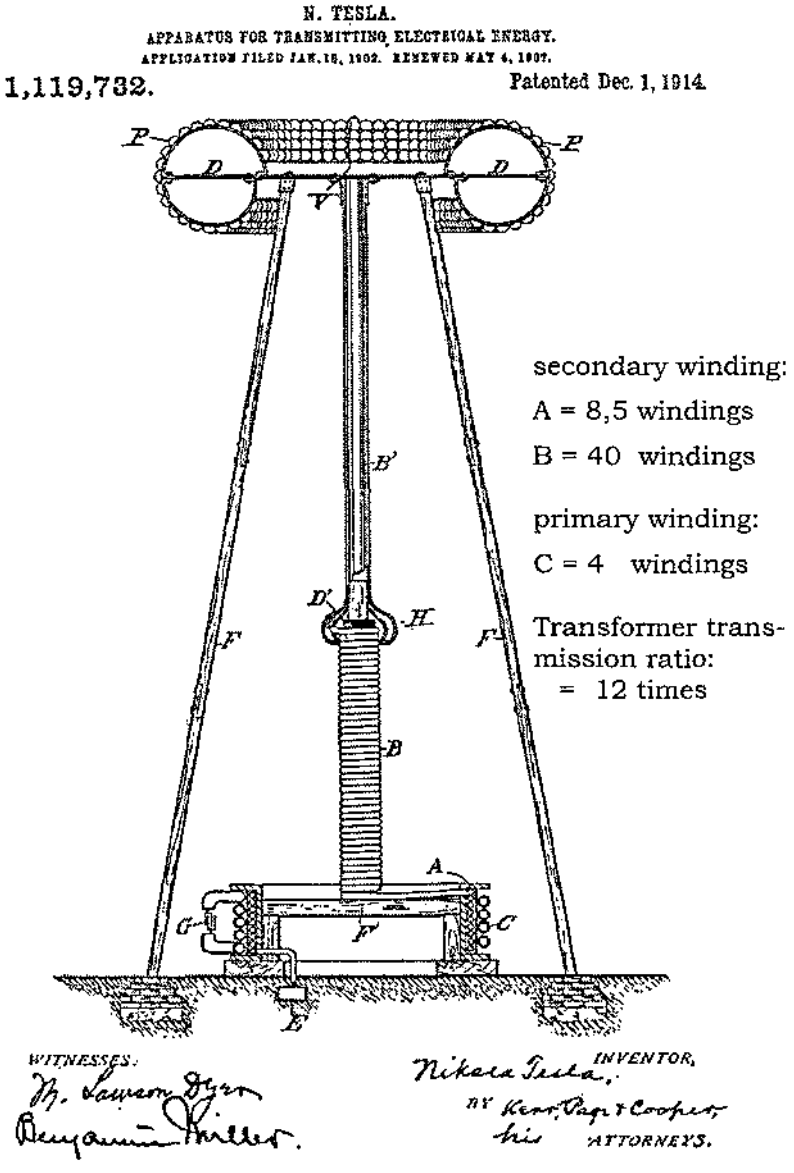


Fig. 9.11: Concerning the technology of the Wardencliff transmitter (fig. 9.10).<i>

<i>: Dr. Nikola Tesla: Complete Patents, (J.T.Ratzlaff), Tesla Book Company (1983), ISBN 0-960356-8-2, P. 435.

9.11 Ecologically fair usage

Tesla not only has stimulated ecologically fair usages of the energy radiation. To that can be counted the use of a Tesla transmitter as a radiation weapon<i> as well as the mentioned building of a Tesla interferometer, the low-frequency interferences of which can lead to mighty gravitational waves and with help of which it should be possible, to produce earthquakes, to sink ships or to shoot down planes from the sky<i>. Against the background of two world wars it can be understood, why Tesla has drawn attention to the possibilities of a use of his system for the purpose of defence.

In today's sight a technology like Tesla's wireless energy transmission (fig. 9.11) hardly would have any chance of a large technical use, because it should be reckoned with enormous problems of environmental compatibility. After all had come out in our considerations, that entirely in contrast to the Hertzian wave just of the Tesla energy wave direct biological effects are to be expected. A purposeful medical use of the Tesla rays however can be imagined.

The collecting of "free" energy waves with a neutrino receiver at first undoubtedly would be a clean and ecologically fair alternative to the present energy technology, with which we heat or nuclearly contaminate our environment. But even the use of free energy converters has limits. Should it turn out that the Photosynthesis uses such a materialization, in which the necessary free electron for the chemical reaction actually is produced from a caught neutrino in the so-called reaction centre and thus the reaction energy is won, then for an as usual excessive use by men it can't be excluded anymore, that the plants on earth die and nothing grows anymore!

I in contrast attribute big chances to the one wire transmission technology. Because for an use of alternative and regenerative energy sources, like the sun in the desert or the geothermal energy in Iceland, the transport of energy has to be made over large distances through the oceans the small losses and the possibility to be able to use sea cables, play a big role. In the residential areas and conurbations on the other hand it has a positively effect, that by the concentration effect of the potential vortices the interference radiation is directed inward. Laid on the bottom of a sea or of a river, such a line in addition is protected against the effects of lightning and sabotage, and it neither spoils the countryside, as the old-fashioned high tension pylons do.

For transportation tasks the mentioned making use of the spin coupling would surely be the most suitable drive. The denser the medium, the more efficient would be the driving effect, for which reason not only flying objects, but quite particularly also ships and submarines could be operated non-polluting in this way without combustion and without exhaust fumes. Build up effects by the water pressure or the sound barrier don't occur. But control might not be entirely unproblematic. If for the reason of a unipolar arrangement of the field a relative velocity to compensate the field becomes necessary, then a correspondingly build up arrangement will do so without considering losses. It is no accident that most apparatus which got well-known have flown the builder sooner or later "past his ears" (note of the translator: broke into pieces). Till a commercially utilizable flying saucer has been built, many technological hurdles have to be taken.

Claims to an up-to date environmental policy in view of longitudinal electromagnetic energy waves = Tesla waves = neutrino radiation = scalar waves = potential vortex waves:

1. Gauges must be developed and built, with which the energy waves can be measured.

2. All technical apparatus should be tested regarding the emission of energy waves. Harmful radiation should be avoided.

3. Only such transmitter antennas may be brought into action, which emit a minimum of energy waves.

4. The ability of biological systems to absorb energy waves should be determined. To that also belongs the question, how many vortices collect locally and how fast they fall apart.

5. Limits for allowed pressure produced by artificially energy waves should be fixed, regulations and laws enacted.

6. The in nature available energy waves should be brought to a technical use, with the goal of a natural energy production.

Fig. 9.12: Catalogue of claims concerning the environmental compatibility in the view of the new field theory.

9.12 Claims concerning the environmental compatibility

Now we still not know, if the using of a handy or another electronic device poses a danger to the user. Now, we surely can't exclude a danger, and the statement of the manufacturer, it is safe because all limits have been met, is worth nothing, as long as the part of longitudinal waves isn't measured. Therefore stands at the very top of the list of the catalogue of claims (fig. 9.12) the development and the building of gauges to measure Tesla radiation. More than half the 700 patents of Nikola Tesla concern the building of transmitter and receiver installations for energy waves. Here a lot of valuable clues are found, especially as he himself has built and used some of the switching circuit designs. In the seminar a rebuild is discussed, with which 1995 the existence of longitudinal waves could be proven [A7].

For an earthquake always both, the transverse and the longitudinal wave, occur simultaneously and, taken exact the same is valid for the sound wave, even if the transverse part doesn't get too far in the air. The emission of both parts in analogy is almost to be expected of an electromagnetic wave generator or transmitter. Actually both waves are detectable at the receiving point: The useful transverse wave and the longitudinally propagating vortices, which show as noise (fig. 4.7). If the vortices are predominant and the useful signal goes under in the noise, then a interruption of the radio operation occurs. Also small gardeners immediately near a radio station have made experiences as e.g. in a distance of one kilometre from the transmitter of RIAS-Berlin. They were able to light their allotments day and night with a neon tube, to which they merely had tied a free wire. The radio station immediately insinuated, that they in an illegal manner had tapped their useful wave and damped it. But it can't be excluded, that the transmitter has sent a longitudinal part in the ether too, which was responsible for the energy transport. But that suggests, that also at other transmitter antennas, thus for the mobile phones, the unwelcome parts is transmitted even than, if we don't use it at all.

Still another problem is added. If in a modern receiver radio waves arrive, then they roll up to a standing wave and according to fig. 1.4 to a vortex over the antenna. According to that we aren't able anymore to distinguish, if the transmission took place as Hertzian wave or as Tesla wave. The separation of both sorts of waves has to take place before the antenna is reached.

An up-to date measurement arrangement would look as follows: In front of the receiver antenna a path with a tunnel, which represents an insurmountable obstacle for the transverse waves (fig. 6.14), is placed. Then only the longitudinal waves pass the tunnel, and these at the end of the tunnel can be recorded and analysed with conventional technology. The tunnel is an elegant possibility, to make use of the part of Tesla waves. After all only this part is relevant with regard to the electromagnetic environmental compatibility. Concerning the above asked question we can take home at least one important realization. The probability is quite high, that you actually notice nothing of the handy radiation, because not every system react in the same manner to certain vortices. The resonance conditions regarding frequency, phase and position always have to be fulfilled, if an absorption of energy waves should occur. (fig. 2.10 B, E. coli bacteria).

On the other hand it however can't be excluded, that just you or me synchronize according to frequency and collect 100 % of the transmitted energy radiation. In contrast to the Hertzian wave plays for that the distance to the source of interference only a secondary role! Seen that way worries would by all means be entitled ...

From Indian mysticism:

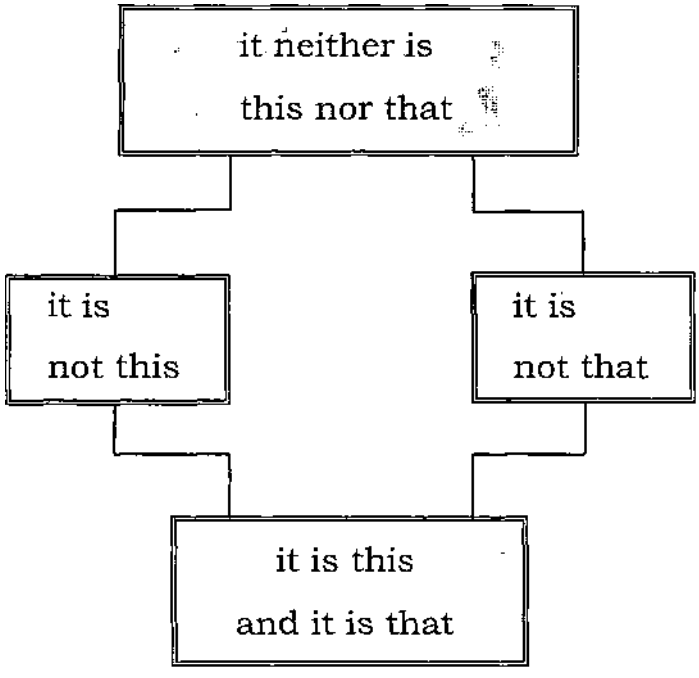


Fig. 9.13: The structure of the world equation, an example from
Indian mysticism

9. 13 Epilogue belonging to part 1

The correctness of a new theory not by all means guarantees, that it also is accepted! A new theory must be used. Only if a concrete need exists then an acknowledgement is to be expected if at first only by the direct beneficiaries.
In november 1994 in Munich the trade fair "Electronica" took place. Here invited by the Deutschen Gesellschaft fur EMV-Technologie (German association for EMC-technology, note of the translator) the books about potential vortices [Al, A2] were honoured with a prize by an internationally renowned EMC-scientist. The number of people, who the potential vortex theory helps further to find answers to problems, which until now aren't explicable, grows further.
Nevertheless, nobody should believe that something will be changed to the content of the text books in the shelves that fast. Habit and laziness encourage to further use the to date interpretation, even if a new theory has ready a better and convincing answer. It will take some time, to give an example, till the heating of water in a microwave oven is explained as eddy losses, as is described sound by the potential vortex theory already today. The discovery of a physical phenomenon may happen in a fright second. Its acknowledgement on the other hand as a rule is a lengthy procedure. If we look back in history we find out that even in the past it hasn't been otherwise.

Of the four fundamental phenomena in fig. 8.2 at first the tension voltages and the charges have been discovered by Coulomb (5.7e).
(5.7c): An effect of the eddy currents was observed already 1825 by the French physicist Arago. He discovered that a magnetic needle suspended above a rotating disc tends to rotate along. Out of ignorance he named the effect "rotational magnetism".
But the eddy currents could only be mathematically described with the help of two laws, the law of Ampere (1820) and the law of induction of Faraday (1831). Because the effect due to the eddy current losses rather was regarded as disturbing, technical applications or patents at first have stayed out. At first Riidenberg has carried out fundamental calculations for eddy current brakes in 1906. The discovery and usage of the "skin effect" is to be attributed to Tesla.
(5.7b): The electromagnetic wave for the first time was mathematically described by Maxwell (1864). He had aimed to calculate the light and he could show, that his theory actually could correctly describe all properties of the light. With that he was able to prove the correctness of his theory. But he had to deal with many sceptics, because he had postulated the dielectric displacement, without however in his lifetime being able to measure it because of its smallness.
This may be the reason, why the discovery is attributed to Heinrich Hertz and was and is spoken of the Hertzian wave. Neutrally seen Hertz at first was nothing more than a enthusiastic pupil, who had worked through the "Treatise"<i>, Maxwells books. All results, which Hertz could observe experimentally, already were contained in the Maxwell-theory and published.

<i>: James Clerk Maxwell: A Treatise on Electricity & Magnetism, vol. 2, Chapter XX: Electromagnetic Theory of Light. Dover Publ. New York

But the great mathematical description of Maxwell at first had a purely academic importance. The interest of the general public on the other hand concentrates on the practical applicability. Hertz had experimented with antennas and has laid the foundations of the building of a gauge for electromagnetic waves (1888). The wireless transmission of invisible waves was convincing. It was an entirely new technology, which stimulated fantasy in view of a technical usage. A practical man, who was stimulated by the theoretical realizations, was Marconi. He goes for the inventor of the radio (1895, Nobel prize: 1909).
Between the three summits, first the calculation and at the same time discovery, second the measurement and third the usage of the wave phenomenon lay 31 years, and the radio technology is developing still further, even today. In the area of the cellular phone network and the telecommunication even a kind of gold mining mood prevails, which can't be impressed much even by hints of an electromagnetic environmental compatibility.

In the euphoria of the past 100 years is fallen into oblivion completely, that besides the by Hertz detected transverse wave in the wave equation according to Laplace and according to the original version of Maxwell also a longitudinal wave was described mathematically. This one was discovered and detected by Tesla in numerous experiments. With reference to his discovery Tesla initially had asserted publicly, Hertz had been at fault, with which he undoubtedly was wrong and had incurred the wrath and the scorn of the scientific community. As a result of this development his experiments haven't been reproduced and the discovery of the scalar wave could fall into oblivion.
Not enough with such sanctions against the inconvenient freethinker Tesla a series of professors like Gibbs and Heaviside have made cuts and discarded all parts from the original version of the Maxwell equations, which by that time weren't considered to be experimentally proven by experiments of Ampere, of Faraday, of Ohm and Hertz. With that the scalar waves fell victim to the axe, what, though it had encountered severe criticism, finally entered as textbook opinion into all textbooks, after Hertz also had sanctioned this measure.
If the field equations according to Maxwell in today's revised version don't describe scalar waves anymore, then all orthodox scientists, who want to bear reference to that, have to bear one thing in mind: discarding a term of an equation is the same as neglecting it. But the term only may be neglected if it is sufficiently small. The first thing every student learns in the physical practical training is that this first has to be tested. For that the term has to be measured and its order of magnitude must be determined. Then it is little helpful and extremely unscientific, if at first is neglected and on the basis of the revised field equations, which have put all scalar waves to zero, is demonstrated that the neglect was allowed or even necessary.
A practical example are the longitudinal wave parts, like they occur and are proven in the near-field of a transmitter antenna. Considering the order of magnitude a neglect is out of the question. On the other hand they should not exist at all according to textbook physics, because they had fallen victim to the axe. Since most scientists in present time do not know about the cutting action anymore, they are postulating field vortices anew in the proximity of an antenna. Field vortices, which are propagating longitudinally in the direction of a field pointer as a scalar wave.

With that they calculate their own arbitrary assumption<i>.
If in the practical training of physics a student unevaluated neglects an essential factor of influence, then his experiment goes as not passed. The experiment must be repeated so long until according to the approved methods of scientific soundness all used neglects have been tested individually and have undergone an error consideration.
Do we now have to deny the cutting action, which had been plotted by Gibbs, Heaviside and others, having the necessary scientific soundness? Do we have to review and rework all textbooks concerning the illegal neglect? Since the cutting action a gap gapes in the field theory!

(5.7d): The potential vortex fills the remaining gap in fig. 8.2. Several research scientists and scientists can be named, who already could observe this phenomenon: in front of all goes Nikola Tesla for discoverer of the Tesla currents, very weak currents which are said to cause extremely high potentials. Here presumably cause and effect have been mixed up, because weak currents never can produce high potentials. Actually the potentials prove to be a result of the potential vortices, whereas the currents aren't more than a result, nothing but leak currents. At least Tesla could use the vortex, but without a usable theory he neither could calculate nor adequately explain it. Besides Tesla Wilhelm Reich should be mentioned, who has collected the vortices in his orgone accumulator.
Mostly only certain aspects were observed and investigated: by Tesla the planar vortex, by Reich the influence on the weather, by Schauberger the water vortices and by all three the medical and biological aspect. The list of names is incomplete and could arbitrarily be continued.

With the discovery of the potential vortex (1990) the basis for the building of a gauge and the technical usage of the physical phenomenon is laid [Al]. It not only concerns the search for water, but also the detecting of the vortex balls and vortex streets, of the standing waves of the energy radiation in the air, at the workplace, at the bedroom, in clinics, in recreational areas and hotels. As explained at the start, neither the field strength of a Hertzian wave nor the arising heat development can be made responsible for biological or technical harm.
It primarily are the newly discovered vortices of the electric field, which take effect. The effects can, as we have seen, as well be good for health as bad for health. Intensity, plane of polarization, vortex configurations and many other characteristics play a role here. To research these influential factors gauges for vortices will be needed as well.
We have to realize that in the technical domain the electromagnetic compatibility of an apparatus is determined by its sensitiveness to vortices, thus by the fact how many and which vortices can cause a function trouble. To determine the environmental compatibility of a product the emitted vortices, the energy radiation, have to be measured. Limits for high tension lines, for screens or handheld phones must be given in units of the potential vortices. The potential vortex has shown us the way to a unified theory and has brought along a new picture and understanding of our environment. It with that wants to show us the correct way for an ecologically compatible dealing with nature.

<i>: Zinke, Brunswig: Lehrbuch der Hochfrequenztechnik, 1. Bd., 3.Aufl. 1986 Springer-Verlag Berlin, Seite 335

Part 1: Edition belonging to the lecture:
"Electromagnetic Environmental Compatibility"

Prof. Dr.-Ing. Konstantin Meyl

Scalar waves

Abstract: 1. Auflage 1996, 4. Auflage and 1st English Edition 2003

Both technical and biological systems can be influenced by electromagnetic fields, whereby numerous questions still are open, like e.g. concerning limits and the nature of physical interference fields. The book shall do justice to the circumstance, that a fact oriented discussion about ,,electrosmog" implies an analysis of possible reasons, a mathematical derivation and a physical argumentation.

We proceed from the assumption, that only that part of the electromagnetic wave should be considered for malfunctions, which has been absorbed and which has rolled up to a field vortex. The effectiveness depends on the amount of the produced vortices and on the life span, the decay of vortices.

Analogous to the sound wave vortices in space are propagating as longitudinal waves. In this context is pointed to numerous effects. Examples for the technical and biological use of these standing waves are the energy transmission of Nikola Tesla as well as the nerve conduction, which functions in a corresponding manner. If the same vortices, which man uses for conduction of information, are emitted by technical devices, then biological reactions can't be excluded anymore and worries with regard to ,,electrosmog" seem to be justified.

Causes, phenomena and natural scientific consequences

INDEL GmbH, Verlagsabteilung, Fax: +49-7721-51870
Tel: +49-7724-1770
Postal and ordering address:
l.TZS, Prof. Dr. K. Meyl, Leopoldstr. 1, D-78112 St. Georgen/Schwarzwald
www.k-meyl.de meyl@meyl.de

Scalar Waves

From an extended vortex and field theory to a technical, biological
and historical use of longitudinal waves.

Part 2

by

Professor Dr.-Ing. Konstantin Meyl

Edition belonging to the lecture and seminar "Electromagnetic environmental compatibility"

(Original title: "Elektromagnetische Umweltvertraglichkeit")

Translated out of the German language
by Ben Jansen
(2000-2003)

* * *

Part 2: Edition belonging to the energy technical seminar

Free energy and the interaction of the neutrino radiation

***

INDEL GmbH, Verlagsabteilung

Villingen-Schwenningen 1996-2003

ISBN 3-98O2 542-4-0

Preface to the seminar

The point of a seminar is, to deepen, to practise and, as far as possible, to practically appy the material of a lecture. The knowledge of the content of the lecture hence is a prerequisite for the participation.
For the reader of this book that's tantamount to the recommendation, to have read the first part, the edition belonging to the lecture, before*[1]*. Here the questions concerning the „electromagnetic environmental compatibility" are asked and the necessary bases for their answering is laid. Also practical consequences for various areas of science are indicated. The deepening most suitable should be made in form of a seminar, subdivided into the here presented part 2 to the energy technical seminar and a part 3 to the information technical seminar. Part 2 correspondingly concerns the energy technical aspect of electric or magnetic longitudinal waves, whereas part 3 is dedicated to the information technical aspect<ii>. Because it concerns a book which merely for reasons of usefulness is published in three parts, the chapters are consecutively paginated. References to chapter 1 to 9 hence automatically relate to part 1. The numbers of the figures and tables as a rule are identical with those of the chapters, in which they are discussed.

The seminar should lead on over the pure reading, consuming or listening and should stimulate to join in. All involved persons may and should give ideas and ask questions, even if these may sound little orthodox. The scientific working method takes, that is struggled for answers and even is argued, if necessary. To reach this goal, it mustn't exist any obligation or censorship, neither for the leader of the discussion nor for the participants of the seminar.

The seminar is being carried out since the summer semester 1997. The works of the seminar written by students treat the knowledge of text books of the respective theme. Following the lecture the answers are discussed and compared to those of the theory of objectivity<i> and other models of explanation. This procedure in this edition belonging to the seminar is reflected at some points, if for instance a chapter is completed with a „discussion".

The first edition of this 2nd part still was incomplete and has been handed out to the participants of a congress in Switzerland instead of a manuscript belonging to the lecture the 17th of Nov 1998. The here presented second edition in the meantime to a large extent is complete, but surely not yet perfect. In accordance with the experience made with the first part of the book also for this 2nd part a third and revised edition, in which the ideas of the participants of the seminar and of the readers find consideration, will be due to be dealt with after a year. The reader of the second edition has to console himself with the fact that a lively seminar constantly is changing and developing further. And that has to be so!

Villingen-Schwenningen, January 1999

<i>: Electromagnetic environmental compatibility, Part 1, Edition belonging to the lecture, INDEL Verlagsabteilung, 1996, see page 1-218 of this issue.

<ii>: Electromagnetic environmental compatibility, Part 3, Edition belonging to the information technical seminar, 2002, see page 443 - 625 of this issue.

10. Oscillating interaction

A theory is not an end in itself, even if it sounds very convincing. It has to be measured by its applicability. As an entry into the practical consequences, which result from the theoretical part[i], the question about the validity of Kepler's laws is raised.

10.1 Kepler's laws

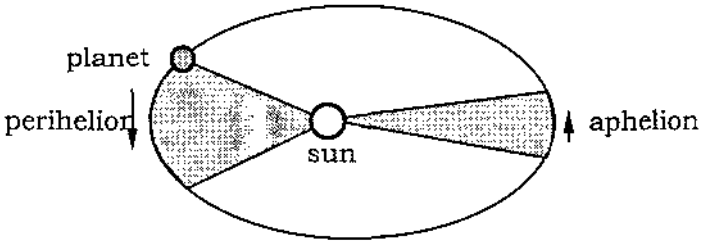
The "radius vector", a line drawn from the sun to a planet, sweeps out equal areas in equal periods of time. At least has teached us Johannes Kepler it that way (fig. 10.1). The balance of forces, the gravitation on the one and the centrifugal force on the other hand results in the innermost planets of our solar system orbiting the sun very much faster than the outer planets (Mercury in 88 days, the Earth in 365 days, Jupiter in 4333 days and Pluto in 90465 days!).
For the inner planets as well as the big planets Jupiter and Saturn Kepler's laws are still found confirmed. But that shouldn't apply anymore for the outermost planets of the solar system. Beyond Saturn should prevail changed rules as is said, based on observations of the Voyager spacecrafts[ii].

If we direct our view to an unknown galaxy, then does it rotate around its centre and in doing so to a large extent keeps its form. Despite rotation of its own an elliptic, a barred or even a spiral galaxy virtually doesn't change its characteristic form. From this follows, that the inner stars of a galaxy are considerably slower on their way than the outer stars! But we expected exactly the opposite.
According to Kepler's regularity the outermost stars would have to orbit extremely slow, In order not to be hurled into space as a result of the centrifugal force. But then a galaxy wouldn't keep its structure. The spiral form, as it already has been observed and classified by Hubble (fig. 10.2), merely would be an accidental exception as a momentary picture, but by no means the rule.
We have to take note, that the structure and in particular the cohesion of a galaxy can't be explained with Kepler's laws[iii].

<i>: Konstantin Meyl: Electromagnetic environmental compatibility, Part 1 of this book: Causes, phenomena and natural scientific consequences.
<ii>: Kendrick Frazier: Das Sonnensystem, Time-Life Bucher, Amsterdam (1991)
<iii>: The basic laws of the universe start to rock: ,,What is the matter with the galaxies? They rotate in their fringe ranges much faster, as is allowed by the laws of physics. Or is something wrong with these venerable laws? The astronomers and physicists stand for the dilemma to have to decide between the two alternatives: feign the observations us an other world or do we calculate wrong since centuries?" (translated), Bild der Wissenschaft Nr. 2, 1989

Kepler's 1st law:

The planets move in elliptical orbits, with the sun at one focus.



Fig, 10.1: Kepler's 2nd law (concerning the conservation of angular momentum):

The line drawn from the sun to the planet sweeps out equal areas in equal periods of time.

Kepler's 3rd law:

The ratio of the squares of the revolutionary periods of two planets is equal to the cube of their average distance to the sun:

(10.1) $$\frac{t_1^2}{t_2^2} = \frac{r_1^3}{r_2^3}$$

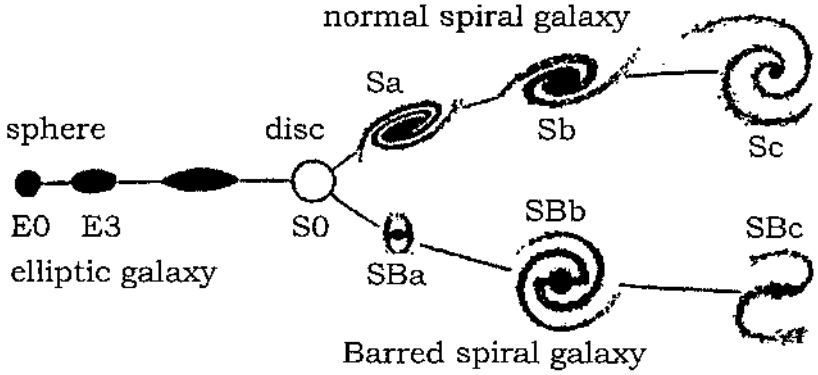


Fig. 10.2 The classification of the galaxies according to Hubble<i>

<i>: according to H. J. Lugt: Vortex Flow in Nature and Technology, page 223

10.2 Unknown interaction

So which interaction keeps a galaxy together? We today believe to know four different sorts.

I. The gravitation[i]: But since Kepler's law isn't valid in this case anymore, the gravitation is ruled out from the start. Obviously for the distances in a galaxy it hardly is effective.

II. The electromagnetic interaction: It is responsible for the structure of the atoms. Looked at from the outside atoms carry no charge, i.e. the charge conditions are balanced. A binding of our sun to the centre of the Milky Way by an electromagnetic interaction thus is ruled out as well.

III. The strong interaction: Since for the proton another charge distribution is measured, as a single positively charged particle should have according to the normally used theory, the strong interaction was introduced as a nuclear force, to explain the big error, the grave difference between measurement and calculation. The good advice hence reads: instead of giving birth to postulates at random, first of all the fault should be searched for in the normally used theory[ii]!

IV. The weak interaction: It quite obviously is involved in the particle decay[ii]. Both, the weak and the strong interaction, only have an extremely short range. With this property they consequently won't be able to keep a galaxy together.

Conclusion: In a galaxy a still unknown interaction takes effect, and science is requested to search it.

Both interactions with infinite range, the electromagnetic interaction and the gravitation occur as a result of static fields, therefore assume a constant charge or a constant mass. Considered more exactly in that case it merely can concern special cases. Gravitational waves, which reach our earth and which are detected in very costly experiments[iii], already show that the existence of alternating fields can't be excluded and oscillating interactions by all means are conceivable! The physical research at present probably is on the right track. The researchers however don't have ready an usable explanation yet. We accept the challenge!

<i>: Derivation of Kepler's 3rd law in fig. 11.10

<ii>: Konstantin Meyl: Potentialwirbel, Band 2
INDEL-Verlag, Villingen-Schwenningen 1992, ISBN 3-98O2542-2-4

<iii>: Gero v. Randow: Wenn kosmische Katastrophen Raum und Zeit verbiegen, zum Thema Gravitationswellen-Detektor, VDI Nachrichten Nr.9, 1.3.91, S.32

Analogy:

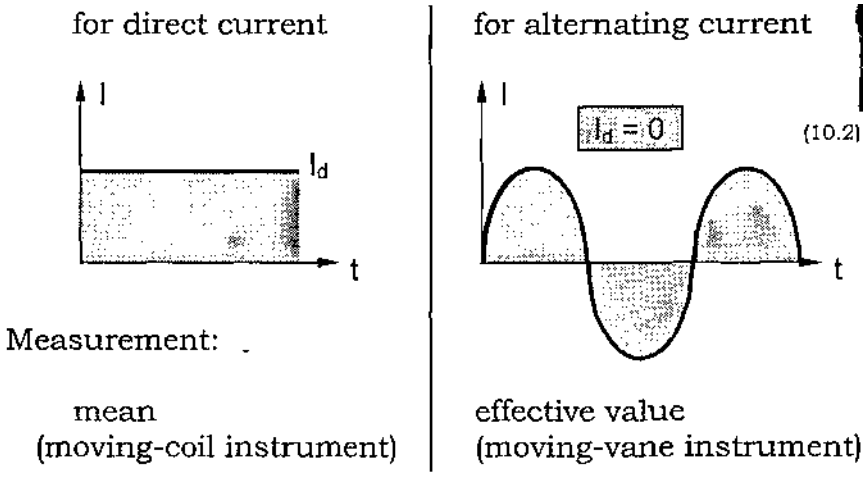


Fig. 10.3: Direct current and alternating current

constant charge: **Electromagnetic Interaction**	oscillating charge: **Resonant Interaction**
constant mass: **Gravitation**	oscillating mass: **Levitation**

Fig. 10.4, a: The four fundamental interactions

10.3 Harmony of the alternating current engineers

Today's situation can be clarified by the following picture: you engage a "direct current engineer" to measure the tension voltage in the socket of our power supply system. The ,,dyed-in-the-wool direct current engineer", who never has heard anything of alternating current, reports: ,,No tension voltage is measurable". If he for reason of your doubtful expression looks still more exact he will realize: ,,The pointer of my moving-coil instrument strangely fidgets around zero, but the swing is so small that one confidently can touch it", (fig. 10.3)
Modern science is accustomed to say, without a valid theory and without technical measurability nothing can exist, what mustn 't exist. If you drop dead after the experiment, then you probably had a weak heart or other afflictions. In such cases as a rule the victim himself is to blame and by no means theoretical physics!

In the case of our power supply system the answer is known: The mean of the alternating voltage of the network is approximately zero. The pointer of a moving-coil instrument for reason of its inertia can't follow the fast changing anymore and only fidgets on the spot. The effective value however amounts to around 230 Volts. But to measure it you need another device, for instance a moving-vane instrument. Seen so, direct current describes the special case of alternating current with frequency zero.

The properties of alternating current can be depicted best by an extraterrestrial observer. He will tell us: Seen from a distance at least at night a great harmony seems to prevail on earth. All lights in the streets and cities twinkle completely synchronously. All generators are in resonance among each other and with all consumers. There are two big races: The 50 Hertz race and the 60 Hertz race, which appear if the earth turns further and the 50 Hertz race is switching off again its twinkling lamps.

The synchronization necessary for an exploitation of alternating fields is so obvious for us, that hardly anybody realizes, that a consumer operated with only one Hertz difference to the frequency of the network can't be supplied with power anymore. Apart from the correspondence in frequency it even depends on the correct phase. The phase angle must be between 0 and +90°. This corresponds to an efficiency factor $\cos\varphi$ between 1 and 0. The cable connections serve both the transport of current and the synchronization of all the generators and consumers connected to the network. The frequency is kept so constant that simple clocks, switching stations and even old record-players can be operated synchronously with the frequency of the network.
The synchronization of the feeding in power stations is supervised by a station of its own, which dictates the time. It is true that we aren't capable of seeing the twinkling of the lamps anymore for reason of the inertia of our eyes, but it can be detected and filmed with high-resolution cameras. Even if we can't perceive the harmony of the alternating current engineers, it nevertheless exists.

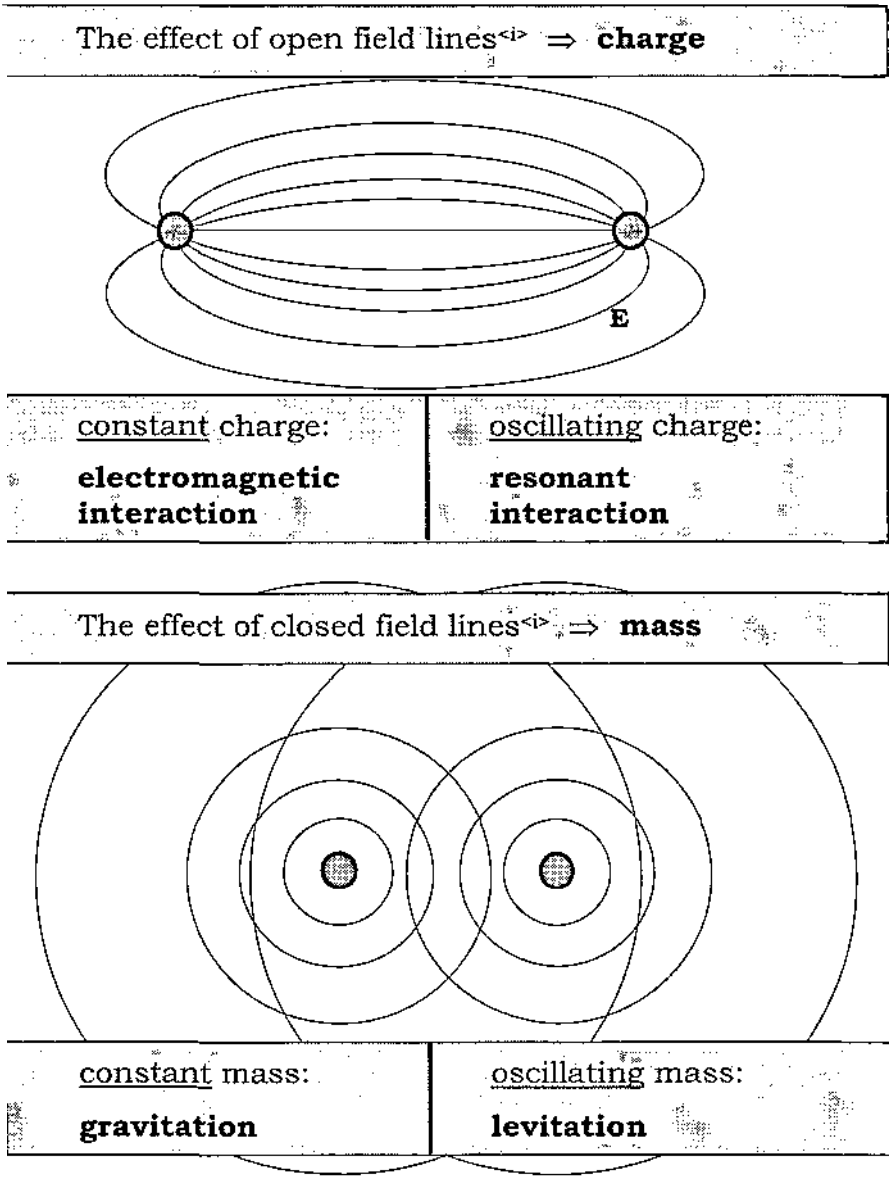


Fig. 10.4, b: Explanation of the fundamental interactions

<i>: Konstantin Meyl: Potentialwirbel, Band 2, INDEL-Verlag (1992)
see also in Part 1, chapters 6.8 and 6.9

10.4 Four fundamental interactions

These considerations suggest, that also gravitation and electromagnetic interaction merely describe the special case of oscillating interactions with frequency zero. To avoid confusions, we'll have to think of new names.
The electromagnetic interaction can be clarified by means of open field lines, which start at a charged body and end again at another body of unequal charge. In physics classes it is normal to make the field lines of a magnet visible with iron filing. Between the unlike poles a force of attraction is observed<◁▷>.
If we this time assume that both magnetic poles change their polarity at the same time, then the force will decrease for a short time during the changing of polarity, to afterwards be active again in full magnitude and in the same direction. Therefore a force of attraction is observed again even for a reversed polarity.
The generalization hence reads: The electromagnetic interaction will occur also in the oscillating case, but in weakened form, if both bodies involved in the interaction change their polarity synchronously and if they are in resonance. A name by analogy would be "resonating interaction" (table 10.4).

It is known of the electromagnetic interaction, that its effect is larger than that of the gravitation by powers often. This presumably has to do with the described and observable bundling up of the open field lines, whereas closed field lines can't be bundled up. The gravitation hence is linked with the closed field lines, which surround all elementary particles, every atom and every body<◁▷>.

The opposite of the bundling up is the repulsion of open field lines, for which reason here also forces of repulsion can occur. For the gravitation however no repulsion is observed, because closed field lines virtually can't be influenced.
Apart from the circumstance that the effect generally will be smaller in the oscillating case, similar properties are to be expected. Also its range will be infinite as well. It is recommended to call the case of oscillating charges, as already said, "resonating interaction" and the case of oscillating masses, the oscillating gravitation, „levitation" (table 10.4).
The term „levitation" is very appropriate, but not new. Unfortunately until now no generally binding definition existed, what should be understood by that, for which reason misinterpretations and irritations can't be excluded. Mostly levitation is linked to a cancellation of gravity, up to a state of free floating, but we will see that quite other phenomena become describable with this term.

10.5 Resonating interaction

The question, what keeps a galaxy together, now can be answered unambiguously. The well-known interactions already have been excluded. If for the enormous distances the gravitation can't keep the outer stars anymore in accordance with the Kepler rule, then the levitation won't be able at all.

Example: central star S_z with 3 planets P_1-P_3
and with 4 neighbouring stars S_1-S_4

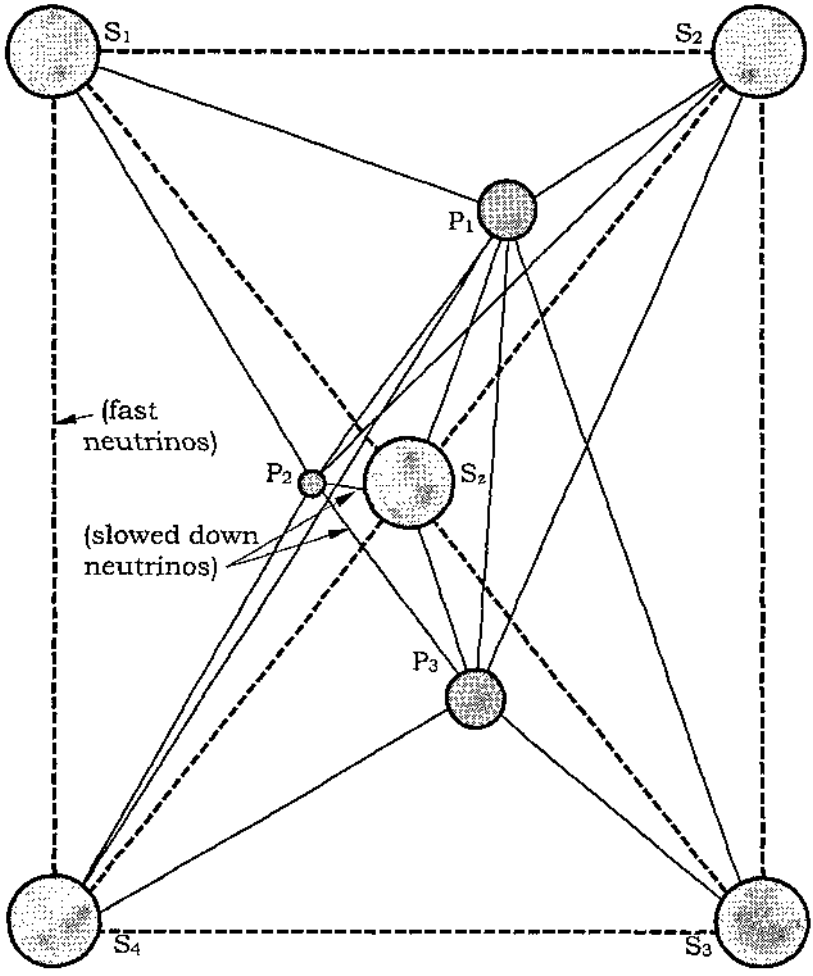


Fig. 10.5: The invisible threads of a resonant interaction

milky way-radius: 15000pc*3*10^9 = 45*10^{16} km
sun system-radius: 50 a*15*10^7 = 7,5*10^9 km

$\frac{45 \cdot 10^{16}}{7{,}5 \cdot 10^9} = 1{,}27 \cdot 10^8$ the resonant interaction is more than eight decimal powers bigger than the gravitation!

Therefore the oscillating charge is left. Actually the resonating interaction will reach to the outermost areas of a galaxy. The bundling up of the field lines results in the centre of the galaxy and one of its stars to stand in an exclusive resonance to each other, what looked at from the outside looks like, as if the star hangs at an invisible string or a "rubber band" and thus turns around the centre.
Because quite a few stars hang at the centre of a galaxy, it can be assumed that it provides correspondingly many resonance. The centre perhaps is comparable with an extremely broad banded transmitter, which operates on all channels simultaneously. The stars then pick as a receiver the for them suitable channels and hang themselves by „rubber band" at the heap (fig. 10.5).

Should there exist any particles with an oscillating charge, which synchronize between centre and star with the resonating interaction, then they will mediate between both partners. If we assume that the centre at one channel just is positively charged, then all at the same time negatively charged particles will be attracted, the positively charged particles however repelled. Whereas the unlike particles in the centre participate directly in the production and maintaining of the oscillation, the like positively charged particles will be hurled into space.
But at the same time does a star, which clings to the centre, have to be negatively charged. It hence attracts the repelled particle. The particle thus drifts from the centre to the star, even then if all three, the centre, the star and the particle, change in polarity. The result is, that the stars grow in diameter by collecting the particles. Only because our sun actually grows, it has the chance, to sometime become a red giant!

Since the sun radiates, as is well-known, in every second a radiation equivalent of 5 million tons, it permanently has to be supplied with a substantially greater amount of matter. If a resonating interaction should occur, then our sun will get its „material" supplied from the centre of the Milky Way and that is a black hole! But no particle with a mass comes out of such a hole, yes not even light. For a particle to be able to leave the black hole, it should have neither charge nor mass. At most an oscillating charge and mass would be allowed. Such a particle would have an enormous ability of penetration as a result of the missing static interaction. It would be able to rush through the earth unhindered.

According to actual knowledge only neutrinos have the described properties. One also knows that the centre of our Milky Way represents a mighty source of neutrinos. From this derivation follows:

1. As mediators of the resonating interaction serve synchronously oscillating neutrinos.
2. Starting with the proof of the neutrinos it should be able to backwards also prove the existence of the resonating interaction.
3. If, as a practical consequence, we imagine that the centre of the Milky Way wouldn't supply neutrinos anymore. Then the whole galaxy would fall apart and not one of its stars would shine anymore.

Fig. 11.1: The Atlantic ocean floor<i>

<i>: Miller, R.: Driftende Kontinente, Time-Life, Amsterdam 1991, S. 79

11. The growing globe

11.1 Long-distance effect of the neutrinos

The long-distance effect thus lies in the circumstance that the neutrinos, in the case of a resonance of the source of neutrinos and the receiver, span an invisible „rubber band" between both, which is called resonating interaction and keeps the two together.

As a transmitter of neutrinos functions for instance a supernova, the death of a star, in which 98% of the mass annihilates under emission of neutrinos or a black hole, which continually swallows light and matter and spits them out again as neutrinos after a still unexplored „process of digestion". The process, which in the case of a supernova takes place as a singular occurrence, in a black hole possibly takes place permanently. The hurled out neutrinos on the other hand serve the sun as a source of energy. A receiver of neutrinos then for instance is our sun. So that the hard and very fast cosmic neutrinos become utilizable for the sun, they at first have to be slowed down. But that is only partly successful:

1. Some very fast ones manage to pass through the sun and fly out again on the other side of the sun. The compared to the cosmic neutrinos strongly slowed down neutrinos then are called solar neutrinos.
2. Another part can be further slowed down and materialized. As a result of the oscillating mass of the neutrinos as well particles of matter as also some particles of anti-matter are formed. The particles of matter make the sun grow.
i. The with matter incompatible anti-matter annihilates under emission of light as is well-known. For this and for no other reason our sun shines!

Also the planets have such a neutrino reactor at their disposal. Only so the heat in the inside of the earth is explicable! It can be assumed that the planets materialize less the fast and hard cosmic neutrinos and that they are served more by the slowed down solar neutrinos, which our sun releases again unused.
As is well-known radiates the planet Jupiter already today twice as much radiation energy, as it from the sun receive. In this typical encyclopaedia type balance the involved neutrinos of course are not considered. But it shows that Jupiter is on the best way to become a sun itself. Its moons then will become planets.
From this the example we also see that with increasing mass the crust of the planet becomes thinner and thinner at the expense of the neutrino reactor in the inside, until it finally is eaten up and the celestial body openly starts to shine. Astronomers report for reason of their observations of the formation of more and more new stars.

One part of the collected neutrinos thus is materialized by the planet. In the case of our earth it contributes to its growth.
Who doesn't want to believe that the earth becomes bigger, should look at modern maps of the oceans, on which the topography of the ocean floor is shown. According to the theory of Alfred Wegener concerning the continental drift North and South America on the one hand and Europe with Africa on the other hand steadily drift apart since 200 million years. The result can be read at the atlantic ocean floor. The gaping, chequered rift zones to the right and left of the Mid-Atlantic Ridge show how the earth is torn apart (fig. (11.1).

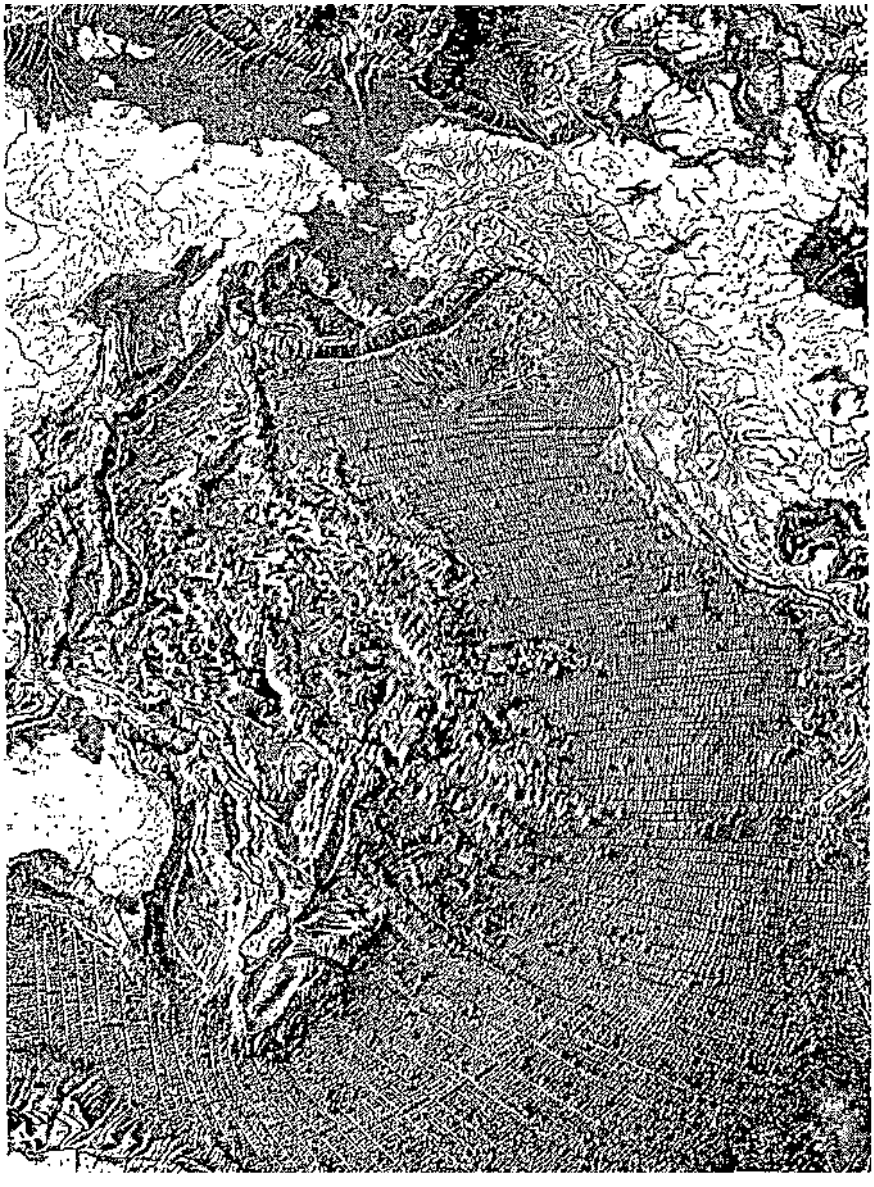


Fig. 11.2: The pacific ocean floor<i>

<i>: Miller, R.: Driftende Kontinente, Time-Life, Amsterdam 1991, S. 78

11.2 Model of expansion

Geographers assume that at another point to the same extent continental plates are subduced and molten. That thus has to happen in the Pacific Ocean. But the sea maps tell one just the opposite (fig. 11.2). At the ocean floor of the Pacific Ocean the same rift formations are found as in the Atlantic Ocean (fig. 11.1). That means that America drifts away from Australia and Asia exactly as from Europe, without being crushed or molten in doing so!
The only possible answer thus is: the earth grows.
The characteristic rift zones in addition are found around the Antarctic. From this the conclusion can be drawn that the 7th continent slowly is moving away, while the biggest habitable mass of land predominantly stays behind on the northern hemisphere, by Eurasia and North America forming a clip around the North Pole.

Concerning the evolution of the earth there are and were numerous approaches in various directions. Paul Dirac<i> at his time postulated, the brightness of the sun should decrease as a result of a decrease of the gravitational constant as well. In contrast to that Astrophysicists today observe just the opposite (Ingersoll 1987). According to the hypothesis of Carey<ii> energy will transform in matter in the universe. According to the idea of Oesterle<iii> aether particles are absorbed, which make our globe grow. Also other research scientists share the idea of the growth of the earth with him in their reports<i4,5,6>. As a geologist Oesterle<iii> cites his colleague Herzig: „The at the Mid-Oceanic Ridge newly produced oceanic crust has to be consumed again at other points, because otherwise the earth would expand" and criticizes the „plate tectonicians" that they would postulate their model without physical grounds.
He gives some arguments for the correctness of the model of expansion <iii>:

a) Subduction: The already discussed missing of zones of subduction and of melting of continental plates to the assumed extent.

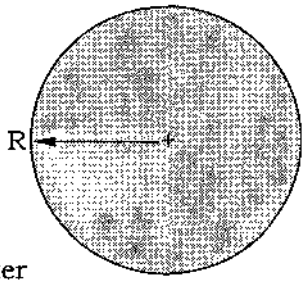
b) Paleomagnetism: errors and mistakes in the hypothesis of the migration of the poles.

c) Continental depth drillings: They brought much higher temperatures in depths from 4000 meters, as expected and calculated according to models.

d) Stand of the sea water: Only if the water can spread in newly forming oceanic basins it can be explained, why the covering with water on earth continually is going back. This argument we want to investigate with a derivation of our own.

<i>: Dirac, P. A. M. Nature 139, p. 323 (1937)
<ii>: Carey, S. W.: Theories of the Earth and Universe. Stanford University Press: 1-413, Stanford, California
<iii>: Oesterle, O.: Goldene Mitte: Unser einziger Ausweg, Universal Experten Verlag, Rapperswil (1997), ISBN 3-9520261-9-0
<i4>: Hilgenberg, O. C: Vom wachsenden Erdball, S. 1-56, Eigenverlag, Berlin (1933) und Neues Jahrb. Geol. Palaont. Abh. 116, 1, Berlin (1962)
<i5>: Jordan, P.: Die Expansion der Erde. Vieweg 1-180, Braunschweig (1966)
<i6>: Giancarlo Scalera, K.-H. Jacob: Why expanding earth? Institute Nationale di Geofisica e Vulcanogia, Roma and Technical University of Berlin 2003

Today's earth:



equatorial radius: R = 6378 [km]

earth's surface: $O_E = 4 \cdot \pi \cdot R^2$
(sphere) $= \underline{5,112 \cdot 10^8}$ [km²]

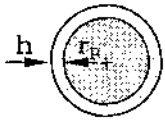
29% of this area is land and 71% is water
for an average water depth of $t_w = 3.8$ [km] results a

water volume of: $V_w = 0,71 \cdot O_E \cdot t_w = \underline{1,38 \cdot 10^9}$ [km³] (11.1)

The earth **200 million years ago** (super continent: **Pangaea**):

today's land area (29%) was 100% of the earth's surface!

Pangaea surface area: $O_p = 0.29 \cdot O_E$
$= \underline{1,48 \cdot 10^8}$ [km²]
$= 4 \cdot \pi \cdot r_p^2$ (11.2)



Pangaea radius: $r_p = \sqrt{O_p/(4 \cdot \pi)}$
(corresponds to $= \underline{3435}$ [km]
the radius
of the sphere of shelf): = 54% of today's radius

Pangaea volume: $V_p = \frac{4}{3} \cdot \pi \cdot r_p^3 = \underline{1,697 \cdot 10^{11}}$ [km³] (11.3)

Pangaea was covered with water h [km] high:

volume: $V = V_p + V_w = \frac{4}{3} \cdot \pi \cdot (r_p + h)^3 = \underline{1,71 \cdot 10^{11}}$ [km³] (11.4)

= 15,7% of today's volume of the earth

$r_p + h = (3 \cdot V/4 \cdot \pi)^{1/3} = 3443,8$ [km] (11.5)

Pangaea water-level h above the NN (sea-level) at that time:

$h = \underline{8,78}$ [km] (11.6)

Fig. 11.3: The calculation of the covering with water on earth 200 million years ago

11.3 Ancient Egyptian legend of Genesis

We don't have to search long for evidence. If we go back 200 million years in the history of the earth, as all continents still were united and formed the super continent Pangaea, as the 29% landmass of today thus constituted 100% of the earth's surface. At that time the diameter of the earth was almost half of today's diameter (exactly 54%). But if one distributes the amount of water of our oceans of today over the smaller earth, then possibly the water stood the young earth up to its ears in a first rough estimate. We now want to calculate how high the water stood.
For that we determine at first the water volume of today's oceans, by multiplying 71% of the earth's surface O_E with the average water depth. In doing so it is supposed that the water volume has not changed in the course of time. As an approximation this assumption could be correct if the factors, which influence the water volume, mutually compensate. On the one hand it has to be taken into account that in the process of fusion in the inside of the earth apart from other materials also juvenile water is formed, but on the other hand the water volume is reduced by photosynthesis and by the splitting of water molecules. In the case of the newly formed water it should concern roughly one cubic kilometre per year<i>. The photosynthesis however possibly can be estimated by means of the formed oxygen of the air just as the splitted water by the content of oxygen of the waters and the seas. Since the processes are subject to temporary fluctuations, the exact estimate is difficult. At least should an effect of compensation more or less be taken into account.

Next we calculate the surface of the earth 200 million years ago, the super continent, which Alfred Wegener called Pangaea. If the 29% continental land mass of today at that time constituted the whole surface, then the diameter of the earth at that time was determined at 54% of today's diameter, then the volume together with the water volume would amount to only 15.7% of today's volume and the water stood 8.78 kilometres high above the level NN at that time (fig. 11.3). With that even the highest peaks were under water.

Consequentially stands in the legend of Genesis of the ancient Egyptians: _____
„ They tell us that the earth was completely covered with water and that the earth rose from the water. It is talked about a primeval hill, of which creation took its start, on which the first sunrise and sunset was observed<ii>.

If at that time life only existed in the water, of which we today still can detect the remains in excavations in mountains and plateaus, then it surely wasn't because the evolution had forbidden living on the land. There existed no land! All land was lying under water. But if, looked into the future, the land area increases further at the expense of the surface of the sea, then our earth sometime will dry up, as already other planets before us, e.g. our neighbouring planet Mars.

<i>: Oesterle, O.: Goldene Mitte: Unser einziger Ausweg, Universal Experten Verlag, Rapperswil (1997), ISBN 3-9520261-9-0
<ii>: Robert Bauval und Graham Hancock: Der Schlussel zur Sphinx, List Verlag (1996), S. 253 and in der Sendung: Die grossen Ratsel VII am 25.5.97 in S 3

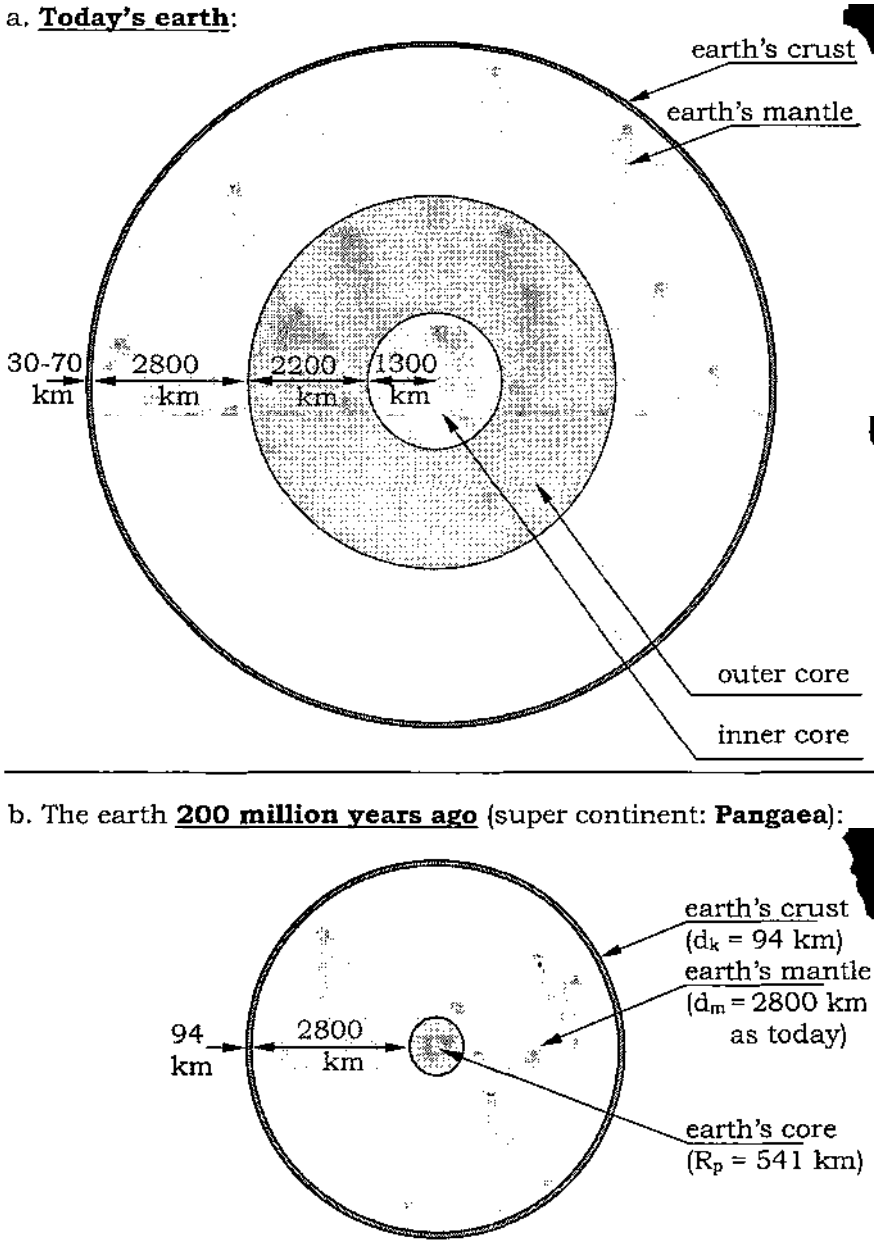


Fig. 11.4: The inner structure of the earth on an average

11.4 Inner structure of the earth

Next the question is raised: How fast does our earth actually grow? The calculated growth, distributed over the 200 million years, results in a yearly increase in the diameter of the earth of less than 0.1 mm. Carey[<i>] assumes 0.04 mm per year and Owen[<ii>] only 0.01 mm per year.
Actually the young earth must have been somewhat bigger than calculated, because as a result of the smaller gravitational acceleration the density of the matter must have been smaller. But this changes nothing to the relations, because the less dense earth was surrounded by likewise less dense water, the water-level nevertheless reached the peaks, as already calculated.
For indicating absolute linear measures and the calculation of the gravitational accleration the respective density should be considered. In most calculations the density is cancelled out, so that as well can be calculated with an unchanged density.

A grave error however lies in the assumption of a linear growth. Hilgenberg assumes an exponential growth[<iii>] and gives as a reason for the empirical approach of the e-function the ,,law of organic growth". In order to now not to speculate or to postulate in the same manner, we will derive and found our approach.

If namely the earth grows, then its core of fusion also grows, which causes the growth to take place accelerated, etc. A customer of a bank, who sees his amount of money grow according to such a regularity, will be given information immediately about the growth rate with a compound interest calculation.
But how big is the growing fusion reactor of our planet? According to today's level of knowledge about the structure of the earth the inner core is surrounded by the outer core and that again by the earth's mantle. On top floats the thin, but firm earth's crust, on which we live. The inner core has a radius of nearly 1390 km, the outer core stretches to a radius of 3500 km, whereas the crust is only between 10 and 78 km thick, dependent on the geographical latitude[<i4>] (fig. 11.4).

<i>: Carey, S. W.: Theories of the Earth and Universe.
Stanford University Press: 1-413, Stanford, California

<ii>: Owen, H. G.: Has the Earth increased in size? - In: New Concepts in Global Tectonics, Texas etc. University Press (1992), p. 289-295, Lubbock

<iii>: Hilgenberg, O. C: Vom wachsenden Erdball, Berlin 1933, Eigenverlag, Seite 31 und 32

<i4>: Mitton, S. (Herausg.): Cambridge Enzyklopadie der Astronomie
(The Cambridge Encyclopaedia of Astronomy), Orbis Verlag (1989)

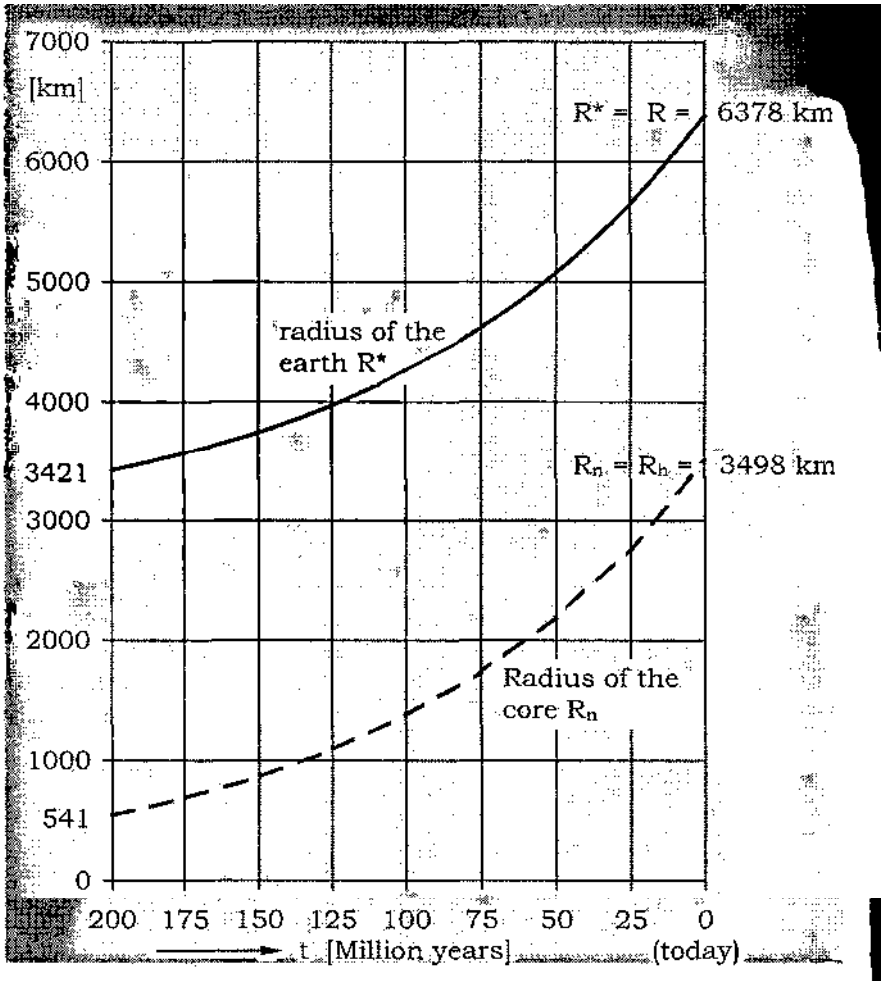


Fig. 11.5: The change in the radius of the earth and of the core in the course of millions of years until today.

calculation: (see fig.11.6)

$$R^* = 2879{,}5 + 541 \cdot q^{n/3} \text{ [km]} \qquad (11.7)$$

t years ago: with: $t = 2 \cdot 10^8 - n$ [a] and: $q = 1 + 28 \cdot 10^{-9}$

correspondents to the approximation:

$$R^* = 2880 + (6378 - 2880) \cdot e^{-t/\tau} \text{ [km]} \qquad (11.8)$$

with the time constant: $\tau = 107{,}1$ Mio. Jahre

11.5 Earth's core as a converter of neutrinos

I proceed from the assumption that the conversion of neutrinos and materialization in elementary particles takes place in the inner core. For the conversion no energy at all is used, because the inner energy together with the outer energy of the particle amounts to zero. The neutrinos merely have to be remodelled into another structure and for that they at first have to be slowed down with the help of the oscillating interaction.
During this process of slowing down, as said, no heat is formed because in the case of a mass less particle no energy can be set free in the domain where the classical law of conservation of energy is valid. Only after completion of the process of materialization we are able to detect mass and energy of neutrinos.
But if the oscillating interaction is taken as a basis, the oscillation with opposite phase between particle and earth's core, then contrary to all expectations a cooling down takes place. If the particle has reached its region of destination in the core, then the oscillations are overlapping. Mathematically seen they are added with reversed sign; they thus are subtracted. The result of the mutual compensation is the decrease of the thermal oscillation and the cooling down of the region which was expected.
In addition the formed particles with a mass mutually contract (see part I, chapter 8.3 and 8.4) and in doing so are further cooling down, as we will derive (chapter 12.7 with fig. 12.8). The physical limit of the process of contraction and cooling down is formed by absolute zero, at which no thermal oscillation at all occurs anymore, so that superconduction becomes possible with the result of giant electric currents and magnetic fields, which can be detected even at the earth's surface in damped form, for instance with a compass.

The necessary heat energy is flowing towards the quick-frozen inner core from the outside, principally from the outer core. Here, in the core, from the neutrinos slowed down to the speed of light various elementary particles are formed. Most of them immediately fall apart, to form other configurations. In the end only electrons and protons are preserved, which, as the only stable particles, can't fall apart anymore. These again are trying hard to take the state of an atom, which however needs very much space with the large distance between atomic nucleus and hull. Under the high pressure the enveloping electrons therefore will time and again fall into the nucleus to form neutrons together with the protons.
The neutrons need no atomic hull and can, as is well-known of neutron stars, take an extremely high density. In the case of the earth's core the neutrons however cannot be stabilized. The contraction to a neutron is accompanied by a corresponding drop in pressure, so that the neutron falls apart again. A continual oscillation of size is formed, with which the neutrinos again interact. With that also the high density of the earth's core would be explicable simultaneously.
In earth's outer core the various atoms and isotopes are formed, which in the sum release more energy than they absorb in their fusion processes. Here the fusion oven rages, which supplies the inner core with heat energy.
The formed matter is pushed further to the outside, rolls as a viscous mass through the earth's mantle and collects the surplus radiation and heat from the fusion oven.

With this model of explanation we now can tackle the calculation of the growth of the earth (fig. 11.6).

Growth in volume in analogy to the compound interest calculation:

duration: n = 200 million years

starting capital: V_p = Pangaea volume $V_p = (4/3)\cdot\pi\cdot r^3$

final value: V_h = today's volume $V_h = (4/3)\cdot\pi\cdot R^3$

savings bank formula: $V_h = V_p * q^n$ (compound interest) (11.9)

with „interest rate": $q = (V_h/V_p)^{1/n}$ (11.10)

---

radius of the core of the Pangaea sphere:

$$R_p = r - d_m - d_k = 541 \text{ [km]} \quad (11.11)$$

with

Pangaea radius: r = 3435 [km]

earth's mantle: d_m = 2800 [km]

earth's crust: dk = 94 [km] (incl. covering with water).

core radius today: $Rh = R - d_m - d_k = 3500$ [km] (11.12)

earth's crust today: d_k^* = 34-78 [km].

From $V \sim r^3$ the growth factor q is calculated to be

$$q = \left(\frac{V_h}{V_p}\right)^{\frac{1}{n}} = \left(\frac{R_h}{R_p}\right)^{\frac{3}{n}} = \left(\frac{3500 \text{ km}}{541 \text{ km}}\right)^{\left(\frac{3}{2\cdot 10^8}\right)} = 1 + 28\cdot 10^{-9} \quad (11.13)$$

core radius after n years: $R_n = R_p * q^{n/3}$ (11.14)

radius of the earth after n years: $R^* = R_n + d_m + d_k^*$ (11.15)

Fig. 11.6: The calculation of the growth rate of the earth

11.6 Speed of growth

200 million years ago in the centre of the globe a core of fusion has formed and taken up its operation, probably under the influence of a cosmic occurrence connected with a high neutrino radiation. As a result the thin crust of the earth was torn apart and the oceanic basins were formed.

If we assume that the might of earth's mantle (with d_m = 2800 km) and crust (with less than 100 km) haven't fundamentally changed, then earth's core at that time had a radius of only 541 km. The „savings bank formula" now only may be applied for the core and only for its volume. On the condition of a constant neutrino density the volume of the core in every year will grow for one order of magnitude, which again depends on the respective volume itself. There results the in fig. 11.5 presented course of the radius of the core and of the earth.

According to our calculation the earth at present grows every year for $915*10^{11}$ tons, which corresponds to an increase in volume of 16500 cubic kilometres and an increase of area of 5.2 square kilometres. The earth momentarily grows for 6.5 cm per year in diameter, from which follows that the perimeter increases pi-fold and a continental drift of 10.2 cm per year is to be expected across both the Atlantic Ocean and the Pacific Ocean. Geologists today actually measure a plate movement of typically 10 cm, at individual points of up to 12 cm per year[<i>]!

Whoever likes to do handicrafts, can build together a globe of shells by himself. Hilgenberg for that gives a handicraft instruction[<ii>]. He draws the continents of a globe of today and cuts them out. Doing so, not the coast line of today is authoritative, but that of the edge of the shells, at which the mainland plates are breaking off into the deep sea. He hence also speaks of a sphere of shells and helps the handcrafters with the words: ..Because the paper shells of the sphere of shells owing to their strong curvature are difficult to nestle, we cut slits in the paper, which suitably lie there, where mountain ranges stretch and now can start with the gluing". Doing so it shows that the slits in particular in the case of the Ural and the Himalayan gape far apart, that in reversed direction in the case of the enlargement of the sphere of shells the lifting out of the mountains necessarily had to occur at these points by means of upsetting. Under these circumstances our model concept should be further rendered more precisely, If the change of the curvature of the growing surface of the earth is the cause for the lifting out of the mountains, then the surface of the earth 200 million years ago was structured merely by impact craters and by volcanic cones, then the amount of water may have been correspondingly smaller. The additional water of the oceans of today was collected by the earth either from the cosmos, by crossing the flight path of a comet with a water tail, or by the here discussed idea of a core of fusion in the inside of the earth it has produced the water itself!

How ever such detail aspects may have had an effect, it therefore nevertheless changes nothing to the model concept on the whole. Hilgenberg's globe of shells[<ii>] in my opinion to still makes more sense as all the models of explanation, as they are spread in today's text books.

<i>: Miller, R.: Driftende Kontinente, Time-Life, Amsterdam 1991, S. 78

<ii>: Hilgenberg, O.C.: Vom wachsenden Erdball, Berlin 1933, Eigenverlag

Actual data<i>:

mass of the sun	$m_s = 1.99 \cdot 10^{30}$ [kg]	
radius of the sun	$r_s = 696\,000$ [km]	
distance to the earth	$r_e = 149\,597\,870$ [km] (averaged)	
mass of the earth	$M = 5.976 \cdot 10^{24}$ [kg]	
moment of inertia	$J_e = M \cdot r_e^2$ (of the earth orbit)	(11.16)
orbital velocity	$v_e = \omega_e \cdot r_e = 2\pi r_e / t_e$	(11.17)
averaged<i>:	$v_e = 29.79$ [km/s] = constant	(11.18)
revolutionary period	$t_e = 365.25637$ [days] = sidereal year	
equatorial radius	$R = 6378$ [km]	
moment of inertia	$J = (2/5)\, M \cdot R^2$ (of the rotation of its own)	(11.19)
rotational velocity	$v_E = \omega_E \cdot R = 2\pi R / t_E = 0.465$ [km/s]	(11.20)
sidereal time of rotation	$t_E = 1$ [day] = 86 164.1 [s]	
distance to the moon	$r_m = 384\,390$ [km] (averaged)	
radius of the moon	$R_m = 1738$ [km]	
mass of the moon	$m_m = 7.350 \cdot 10^{22}$ [kg] = constant	(11.21)
moment of inertia	$J_m = m_m \cdot r_m^2$ (of the moon orbit)	(11.22)
orbital velocity	$v_m = \omega_m \cdot r_m = 2\pi r_m / t_m$	(11.23)
of the moon averaged:	$v_m = 1.026$ [km/s] = constant	(11.24)
revolutionary period	$t_m =$ 1 sidereal month (from fixed star to fixed star) $t_m = 27.322$ [days]	
observed revolutionary period	$t^*_m =$ 1 synodic month (from new moon to new moon) $t^*_m = 29.53$ [days]	

Fig. 11.7: The data of sun, earth and moon of today<i>

<i>: Mitton, S. (Herausg.): Cambridge Enzyklopadie der Astronomie (The Cambridge Encyclopaedia of Astronomy), Orbis Verlag (1989)

It is an exciting matter, if one can experience for oneself, how the pieces of the puzzle fit together, how the southern end of America is wound around the Cape of Good Hope and the Falkland islands surface for the east coast of South Africa, in the vicinity of Australia how the Antarctic occupies the Pacific basin as a neighbour of Australia, von South, Middle and North America, run through by the equator, etc.
The corrections to the view of life of Alfred Wegener and the geographical evidence, which Hilgenberg gives, are sound, well founded and even after 65 years still highly actual. The physical statements of the geologists however, for instance the earth in the course of time would rotate faster and faster, cannot be followed.

11.7 Conservation of angular momentum

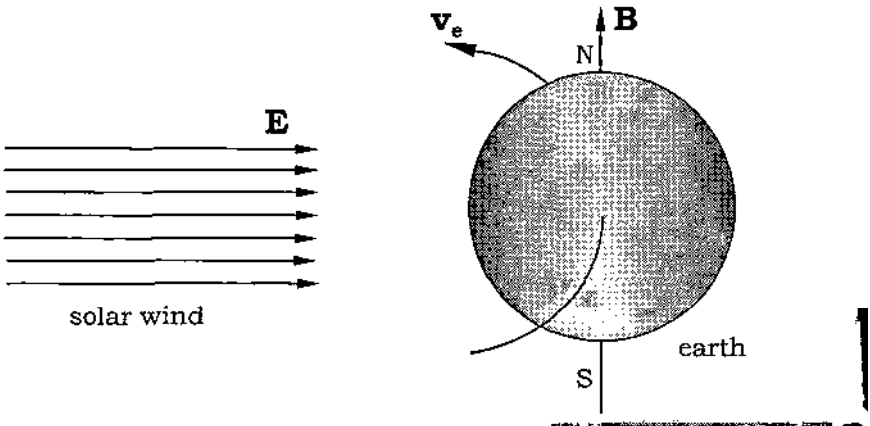
The question about the rotation of the earth is raised. Is it not changing at all, is it getting faster or slower? In the case of a with time growing earth there is only one possibility: The rotation of its own will decrease and not increase, as Hilgenberg supposes. For that you only need to place yourself on a turntable, to turn and if possible with weights in your hands stretch out your arms sideways, to feel, how the rotation of the table is decreasing. It surely would have done the geologist Hilgenberg good, to leave his desk for a short time for a stroll to the most nearby playground, for the purpose of the described physical experiment with himself.

In this case the law of conservation of momentum authoritatively has an effect in the formulation of the law of conservation of angular momentum for the rotating motion. According to that all angular momenta in the solar system should amount to zero. If we look at the planets which have no moon, then is remarkable that these need an eternity for a revolution around their own axis (Venus for instance needs 243 days). According to the law of conservation of angular momentum our earth owes its rotation of its own primarily the moon.

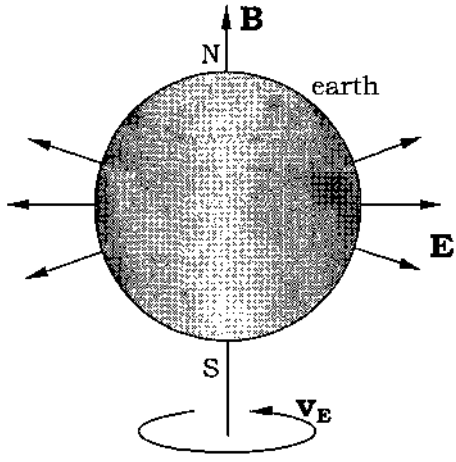
For reason of this relation we can assume a proportionality between the angular momentum of the moon J_m*w_m and that of the rotation of its own of the earth $J*w_E$ (eq. 11.39, fig. 11.10). They even have to be identical, if the partner of rotation earth and moon are seen as a closed system.
If the earth would be approached as a homogeneous, spinning sphere, the angular momentum at first would be too small for a factor 4.1 (eq. 11.29, fig. 11.9). The law of conservation of angular momentum dictates as a necessary result, that the dense core of the earth must rotate faster than the earth's crust! From the correspondence of orbital angular momentum of the moon on the one hand and the sum of the angular momenta of their own of earth's mantle and earth's core on the other hand results a 31 fold higher angular velocity of the earth's core compared to the rotation of the earth's surface (eq. 11.38, fig. 11.9).

Does our earth owe its geomagnetism this rotation of the core? At least the possibility exists that there exists a causal relation between the rotation of the earth's core and the geomagnetism. We'll further collect arguments and put the question concerning the formation of the geomagnetism under consideration.

Concerning unipolar induction (Faraday): $\mathbf{E} = \mathbf{v} \times \mathbf{B}$ (11.25)
(see part 1, eq. 58, fig. 6.4)



with $\mathbf{E}$ = 2 [V/m]
11.18: $\mathbf{v_e}$ = 29,79 [km/s]
} earth magnetic field $\mathbf{B}$ = 67 [μT] calculated
on the average approx: $\mathbf{B}$ = 50 [μT] measured <i>



with $\mathbf{B}$ = 67 [μT]
eq. 11.20: $\mathbf{v_E}$ = 465 [m/s]
and h = 6378+10 [km]
} 10 km high: $U = \mathbf{E} \cdot h = \mathbf{v_E} \cdot \mathbf{B} \cdot h$ (11.26)
U = 199 [kV] calculated
U = 200 [kV] measured <i>

Fig. 11.8: The magnetic and the electrostatic field of the earth
as a result of an unipolar induction

<i>: Measurement values in chap. 2.8, e.g. reference entry <i> (Prof. Dr. L. Konig)

11.8 Set of difficulties concerning the change of magnetization

Now investigations of the polarity of the magnetization of rocks have resulted in the fact that in irregular intervals, on an average every 500,000 years, a change of polarity of the geomagnetism has occurred and no one knows why.
If the rotation of the core should produce the magnetism, then it in any case also is responsible for the process of change of magnetization. That purely theoretically is possible in two ways: Either the core tilts out of its plane of rotation for 180° and rotates suddenly in the opposite direction or earth's mantle together with earth's crust, on which we live, is turned upside down.
It surely isn't my intention to produce any panic, but from a physical point of view only the second case is possible. Usually not the tail wags with the dog, but vice versa, the dog with the tail. The high rotational velocity of the earth's core exerts an extremely stabilizing influence. After all its angular momentum is 4.85 times larger than that of the mantle (eq. 11.33, fig. 11.9). Therefore the rotation of the core and the direction of earth's magnetic field always are preserved seen from the sun.

I further proceed from the assumption, that an electrostatic field arises from the sun accompanied by a particle flux, the solar wind, through which the earth flies through in a perpendicular direction. According to the Faraday law of induction E = v x B (eq. 11.25)
it experiences, as a result of the unipolar induction, a magnetic field which stands perpendicular on the ecliptic and thus dictates the orientation of earth's magnetic field. With that also the direction of rotation would be determined. The core thus by no means can tilt!
On the condition that the core doesn't rotate completely frictionless, the earth's mantle will in the case of the same direction of rotation be accelerated, in the case of unequal direction, after a changing of polarity, it will be slowed down again. If the process, for reasons of conservation of angular momentum, takes place alternatingly with a certain regularity, then the inhabitants of the earth for every changing of polarity might experience, how the North Pole in the shortest time turns over the equator to the South Pole, how the sun sets at the point, where it before had risen. As said, after a changing of polarity our earth is standing on its head! In the Bible corresponding clues are found<ii>.
It can be taken from the media that one reckons with such a changing of polarity in the foreseeable future. When and if it actually takes place, stands however in the stars.

If magnetism thus is produced by the rotation of the core, or by electric currents in the earth's core as a result of the superconduction or by both, then the earth is aligned in the field of the sun like the magnetic needle in a compass. If we take as a cause a solar wind with an electric field strength of just 2 V/m, then this would not only determine the direction of earth's magnetic field, but also the order of magnitude, and that at present lies at 50 uT averaged over time (chap. 2.8).
With the same mathematical relation an electrostatic field around the earth of 199 V/m results as a result of the rotation of the earth. That fairly exact corresponds to the measured values!<i> Quite obviously all is related to each other. In the question for the „how" at this point consciously no definite answer is strived for. It rather should be discussed and worked to together in the seminar.

<ii>: The Bible, OT, The 2nd book of kings 20,9-11 (king Hezekiah) and Joshua 10,12-14, literally cited on the page after the next page (chap. 11.9), note<ii>

Angular momentum $J_m \cdot \omega_m$ of the orbiting moon (with eq. 11.22 + 11.23):

$$J_m \cdot \omega_m = m_m \cdot r_m^2 \cdot \omega_m = 29*10^{33} \ [kgm^2/s] \qquad (11.27)$$

Angular momentum $J \cdot \omega_E$ of the rotation of the earth (eq. 11.19 + 11.20, same direction of turning):

(theoretically) $J \cdot \omega_E = (2/5)\, M \cdot R^2 \cdot \omega_E = 7*10^{33}$ [kgm^2/s] (11.28)

$$\frac{\text{Orbital momentum moon}}{\text{Angular momentum earth}} = \frac{J_m \cdot \omega_m}{J \cdot \omega_E} = \frac{29}{7} = 4{,}1 \qquad (11.29)$$

Angular momentum $J_M \cdot \omega_E$ of earth's mantle and crust (R_h = core radius)

$$J_M \cdot \omega_E = (J - J_K) \cdot \omega_E = (2/5) \cdot (MR^2 - M_K R_h^2) \cdot \omega_E = 6*10^{33} \ [kgm^2/s] \qquad (11.30)$$

$$\text{conservation of angular momentum:} \quad J_m \cdot \omega_m = J_K \cdot \omega_K - J_M \cdot \omega_E \qquad (11.31)$$

Angular momentum $J_K \cdot \omega_K$ of the earth's core

$$J_K \cdot \omega_K = J_m \cdot \omega_m + J_M \cdot \omega_E = 35*10^{33} \ [kgm^2/s] \qquad (11.32)$$

$$\frac{\text{Angular momentum core}}{\text{Angular momentum mantle}} = \frac{J_K \cdot \omega_K}{J_M \cdot \omega_E} = \frac{35}{5} = 7 \qquad (11.33)$$

$$J_K \cdot \omega_K = (2/5)\, M_K \cdot R_h^2 \cdot \omega_K \qquad (11.34)$$

With the mass of earth's core $M_K = \rho_K \cdot V_K = \rho_K \cdot (4/3) \cdot \pi \cdot R_h^3$ (11.35)

and the averaged core density $ro_k = 12000$ kg/m^3

the angular velocity

of earth's core amounts to: $\omega_K = 3{,}3*10^3$ [s^{-1}] (11.36)

and that at the earth's surface: $\omega_E = v_E/R = 0{,}073*10^{-3}$ [s^{-1}]. (11.37)

$$\frac{\omega_K}{\omega_E} = \frac{3{,}3}{0{,}073} = 45 \qquad (11.38)$$

Fig. 11.9: Calculations concerning the conservation of angular momentum and the rotation of earth's core (One turn of the earth's core lasts 32 min. It results contrary to the earth rotation. Of the surface of the earth a period duration of 31 min should be observable.)

11.9 The weakly damped moon

The increasing angular velocity in the direction of the centre of the earth surely has something to do with the set of difficulties concerning the conservation of the spherical structure, comparable to the reason for the particle spin (chapter 6.13). The increasingly missing radial component of the gravitational field has to be compensated by an additional field produced by the rotation (according to part 1, equation 62, fig. 6.5).

The moon apparently doesn't know this set of difficulties. We can assume a constant mass for it (eq. 11.21). On the one hand is the moon smaller than the earth 200 million years ago, as it started to grow. On the other hand are doubts concerning the existence of an active core of the moon legitimate. In the Apollo-15 mission seismic gauges had been installed at the ground of the moon and at the start from the moon the produced seismic waves had been recorded<i>. The surprisingly small damping as the lunar module fell back onto the ground of the moon more likely allow the conclusion that the moon is hollow inside!
Also the small density of the moon points in the same direction, and finally no clues at all can be seen on the surface of the moon, which would point to a growth of the moon.

Apart from the mass also the orbital velocity of the moon is taken constant, what surely is true, as long as nobody and nothing drives the moon extra (eq. 11.24). The analysis of the law of conservation of angular momentum provides the in fig. 11.10 derived provisional result (eq. 11.41).

<i>: Moonquakes ever more mysteriously: ,,The by Apollo 12 triggered moonquake by ,,bombardment" of the surface of the moon with the clapped-out Lunar Module ,,Intrepid" at thursday evening puts scientists for bigger and bigger mysteries. An exact analysis of the measurement data now resulted in the by the astronauts Conrad and Bean installed ,,seismic station" on the moon ... to have recorded and to have sent to the earth 55 minutes long. ... The seismologist Dr. Gary Latham spoke of ,,important information about the structure of the moon" and meant, one now can ,,throw away the text book". One had reckoned that the impact of the Lunar Module on the moon would trigger a quake of at best some minutes", (translated) Frankfurter Rundschau vom 22.11.1969

---

concerning reference entry <ii>, chap. 11.8:

<ii>: The Bible, OT, Joshua 10,12-14: There stands in the ,,book of Jasher ": So the sun stood still in the midst of heaven, and hasted not to go down about a whole day. And there was no day like that before it or after it, ...

The 2nd book of kings 20,9-11: king Hezekiah: This sign thou ... let the shadow return backward ten degrees. And Isaiah the prophet cried unto the LORD: and he brought the shadow ten degrees backward, by which it had gone down in the dial of Ahaz.

For the proportionality of the angular momenta of the earth:

$$J \cdot \omega_E \sim J_M \cdot \omega_E \sim J_K \cdot \omega_K$$

With: $$J \cdot \omega_E = (2/5)\, M \cdot R^2 \cdot 2\pi/t_E \quad (11.28)$$

and the orbital momentum of the moon:

$$J_m \cdot \omega_m = m_m \cdot r_m^2 \cdot v_m/r_m \quad (11.27)$$

is valid the

conservation of angular momentum: $J \cdot \omega_E \sim J_m \cdot \omega_m$ (11.39)

or: $$M \cdot R^2/t_E \sim m_m \cdot r_m \cdot v_m \quad (11.40)$$

with m_m = constant (11.21)
and v_m = constant (11.24): $M \cdot R^2 \sim t_E \cdot r_m$ (11.41)

centrifugal force = gravitational force

$$\frac{m_m \cdot v_m^2}{r_m} = \frac{G \cdot M \cdot m_m}{r_m^2} \quad (11.42)$$

or with eq. 11.22: $$v_m^2 = G \cdot M/r_m = (2\pi r_m/t_m)^2 \quad (11.43)$$

if M = constant: $r_m^3 \sim t_m^2$ (10.1)

Kepler's 3rd law.

Here M ≠ constant, instead v_m = constant (11.23) and therefore follows from eq. 11.43:

(month) $t_m \sim r_m \sim M$ (11.44)

with eq. 11.41:

(day) $t_E \sim R^2$ (11.45)

and for an analogous derivation: (year) $t_e \sim r_e \sim m_s$ (11.46)
with v_e = constant

Fig. 11.10: Calculation of dynamic celestial mechanics

11.10 Calculation of celestial mechanics

We still need a further relation and try the balance of forces between the centrifugal force and the gravitational force. Both the to the outside directed centrifugal force and the to the inside directed gravitational force depend on the mass of the moving body, here the mass of the moon m_m, so that it is cancelled from equation 11.42.
As determining mass only that of the earth is left and that is taken constant in accordance with the knowledge of text books. The result of this assumption is Kepler's 3rd law (eq. 10.1). But beware, it here merely concerns a momentary picture! In the course of time, according to the derivation, the mass of the earth increases so that this assumption is untenable.

Instead, as already said, the average orbital velocity of the moon, one kilometre per second, can be taken constant (eq. 11.24). Since the orbital velocity is calculated from the proportion of the perimeter of the circular orbit $2 \cdot \pi \cdot r_m$ with regard to the revolutionary period of a month (11.43, left page), and at the same time from the balance of forces a dependency of the mass of the earth M and the radius of the orbit of the moon follows (11.43, right page), the interesting relation (11.44) results:
Here the mass M, the radius r_m and the revolutionary period t_m stand in a direct proportionality to each other, and that means: if the mass of the earth increases in the course of time, then the moon will go away from us to the same extent, then also every month will get correspondingly longer.

Clarified with numeric values follows from a growth of the earth for $915*10^{14}$ kg per year a going away of the moon for yearly 5.88 meters (fig. 11.11). The going away of our satellite could be confirmed by means of measurements with laser reflectors, which had been put up on the moon by Apollo astronauts, according to dpa message<i>.

In addition every month lengthens for 3 milli seconds. That is valid for the sidereal month (= 27.322 days), for which a fixed star serves as a reference point for the measurement of a revolution, as well as for the synodic month, as it is observed from the earth from new moon till new moon (= 29.53 days). The synodic month today is longer than four weeks. But 3.7 million years ago it once actually lasted exactly 28 days, as we can calculate easily (fig. 11.11).

But now also the length of a day is changing. If we insert the proportionality (11.44) from the balance of forces in that of the conservation of angular momentum (11.41), then it is shown that a day depends quadratic on the radius of the earth (11.45), that a lengthening of every day for $4.5*10^{-9}$ s can be determined with the help of the growth curve of the earth (fig. 11.5). This is really very small, but 200 million years ago the day had just 19 hours, if extrapolated to 900 million years only 18.04 hours! The result of the american geologists around Dr. Charles Philip Sonett of the University of Arizona in Tucson also is 18 hours in their analysis of correspondingly old sediment formations, as the US science magazine Science has reported<i>. The correspondence of this measurement with our calculation without doubt has force of evidence!

<i>: 900 million years ago a day had 18 hours, Washington (dpa) 1997

Going away of the moon per year with $M \sim r_m$ (according to eq. 11.44): for

$\Delta r_m = r_m \cdot \Delta M/M = 384390[km] \cdot 9.15 \cdot 10^{16}[kg/a] / 5.976 \cdot 10^{24}[kg] = 5.886\ [m/a]$

---

lengthening of month per year with $M \sim t_m$ (11.44) (sidereal): for

$\Delta t_m = t_m \cdot \Delta M/M = 27.322\ [days] \cdot 86164\ [s/day] \cdot \Delta M/M = 36\ [ms/a]$

---

synodic month (from new moon till new moon) of 28 days:

$\Delta t_m = 29.53\ [days] - 28\ [days] = 1.53\ [days] \equiv 132 \cdot 10^6\ [ms]$

linearly calculated $132 \cdot 10^6$ [ms]/36 [ms/a] = 3.6674 mio. years ago.

Day length 200 mio. years ago, with $t_E \sim R^2$ (11.45) amounted to t* hours

shortening: $\Delta t_E/t_E = \Delta R^2/R^2 = (R-R^*)^2/R^2 = (6378-3420)^2/6378^2 = 21.5\%$

$\Delta t_E = 0.215 \cdot 24\ [h] = 5.16\ [h]$ and $t^* = 24\ [h] - \Delta t_E = 18.84\ [h]$

Day length 900 mio. years ago, (R^*=3200 km) amounts to 18.04 hours

---

present lengthening per day amounts to: $\Delta t_E/t_E = 4.5 \cdot 10^{-9}$ [s/day]

---

but: the year increases 130,000 times faster than the individual day!

according to the measurement of Aristarchos 2300 years<ii> ago

is $\Delta t_e = 365.25637\ [days] - 365.25062\ [days] = 0.00575\ [days]$

and $\Delta t_e/t_e = 0.00575 \cdot 24 \cdot 60 \cdot 60 \cdot 1000 / 365.25637 \cdot 2300 = 0.59\ [ms/day]$

---

going away of the earth from the sun per year, with $t_e \sim r_e^{3/2}$ (acc. to eq. 11.46)

for: $\Delta r_e/t = r_e \cdot \Delta t_e/t_e \cdot t = 149.6 \cdot 10^6\ [km] \cdot \Delta t_e/t_e \cdot t = 1.024\ [km/a]$

---

growth of the sun per year/second, with $t_e \sim m_s$ (according to eq. 11.46)

for:

$\Delta m_s/t = m_s \cdot \Delta t_e/t_e \cdot t = 1{,}99 \cdot 10^{27}\ t \cdot \Delta t_e/t_e \cdot t = 1.36 \cdot 10^{19}\ [t/year]$

resp. in a second for: $= 4.3 \cdot 10^{11}\ [t/s]$

and at the same time a loss due to radiation of: $5 \cdot 10^6\ [t/s]$

Fig. 11.11: Figures according to analysis of some examples concerning dynamic celestial mechanics

11.11 The biblical age

We therefore owe the growing diameter of the earth that every day gets longer and longer (eq. 11.45) and from the going away of the moon a lengthening of the month results (eq. 11.44). Not only the months and the length of the days increase, but also the whole year. A corresponding derivation for the revolution of the earth around the sun, as it has been carried out for the revolution of the moon around the earth (eq. 11.44), delivers analogous results (eq. 11.46): The sun determines the length of the year and the distances to the planets. To the extent, to which the sun grows, the solar system increases in extension. Also the distance to the earth increases proportionally with the mass of the sun. By the going away from the sun the temperature on the planets however not necessarily decreases, because at the same time the radiation intensity of the growing central star increases. According to measurements it has increased for 30% since the formation of the solar system<i>.

If both the rotation of the earth and the revolution around the sun get slower, then by all means is conceivable, that the number of days per year approximately stays the same and mankind nevertheless gets less old. If we take the 2300 years old writing of the Greek Aristarchos about the sizes and distances of the sun and the moon<ii>. He determined, assuming a heliocentric view of life, the year to be 365.25062 days. Because the correction taken by Aristarchos concerned even the fifth place after the comma, we must assume that correspondingly precise gauges were available in Alexandria already 310 BC.
The today measured sidereal year with 365.25637 days has lengthened for whole 0.00575 days. From this follows that the year increases considerably faster than the individual day.
It of course would be nice, if we could calculate the lengthening of the year, but unfortunately no data about the growth of the sun are available.
If we proceed from the measurement of Aristarchos, without being able to verify or reproduce its reliability, then from that would result a going away of the earth from the sun for yearly one kilometre, then the sun should grow for $4.3*10^{11}$ tons per second. In any case the sun materializes mass considerably faster, as it loses mass in the same period as radiation equivalent, and that surely is correct (fig. 11.11). Today one generally assumes that „since its formation the earth has gone away from the sun for in total 30,000 km"<i>.

But if in the past the year consisted of less days and every day moreover was shorter, if therefore the biological life time was divided in shorter periods, then mankind could get older, then obtaining a biblical age possibly by no means was unrealistic. If Adam still should have got 930 years old, according to the 1st book of Moses, then his lifetime already must have been quite long ago. While Abraham still did get 175 years old, no successor of him has reached his age anymore. In the Bible it is said: „And the LORD said, My spirit shall not always strive with man, for that he also is flesh: yet his days shall he an hundred and twenty years "<iii>. Today even the limit given by the LORD isn't reached anymore!

<i>: Is the sun loosing her Gravitation? Illustrierte Wissenschaft, Nr.l, 1995
<ii>: Hermann Wild: Technologien von gestern, Chancen fur morgen, Jupiter-Verlag Bern (1996), ISBN 3-906571-13-0, Seite 22
<iii>: The Bible, King James Version, Genesis 6.3

The balance of forces (equation 11.42 generalized):

$$\text{centrifugal force} = \text{gravitational force}$$

$$\frac{M \cdot v_k^2}{r} = \frac{G \cdot M \cdot m}{r^2} \qquad (12.1)$$

results in the cosmic velocity v_k:

$$v_k^2 = G \cdot m / r \qquad (12.2)$$

independent of the mass M of the satellite or planet!

For	$v < v_k$	falling back into the central mass m
For	$v > v_k$	taking the leave into space
For	$v = v_k$	stationary orbit

written down for the n^{th} planet in the solar system:

with $r(n) = r_n$ average orbital radius of the planet

and $v(n) = v_n$ average orbital velocity

as well as: m_s mass of the sun

$$v_n = \sqrt{G \cdot m_s / r_n} \qquad (12.3)$$

or:

$$v_n = G \cdot m_s / v_n \cdot r_n \qquad (12.4)$$

Fig. 12.1: The first cosmic velocity v_k

12. New cosmology

Astronomy still hasn't satisfactorily solved the question of the formation of the solar system. It thereby however concerns a central problem, because it includes the origin of the earth. But as long as we not yet have understood the relations in our nearest environment, the processes, which we observe with giant telescopes in the depths of pace, will remain a book with seven seals, will lose models of explanation concerning the Big Bang and concerning the so-called unavoidable heat exitus every reliability.

12.1 Concerning the formation of our solar system

2-8-1972 the observatories of the sun reported an unusual high solar activity and 6 days later a slowing down of the rotation of the earth occurred, which was recorded as the lengthening of a day for more than 10 milliseconds. This effect hardly can be explained by the tidal friction alone already just concerning the energy balance. Instead this observation makes clear two things to mankind. On the one hand, how much our earth depends on the solar processes and on the other hand, that the changes by all means can occur not continuously, but periodically and if need be even sporadic.

If, as a result of the conservation of angular momentum, the sun determines the orbital velocity of the earth, if it dictates the rotation of the earth by its neutrino activity and the growth of the earth and if the earth in the same manner determines the orbit of the moon, then it would be obvious that the moon originally has been a part of the earth and this in turn sometime a part of the sun. As it came off, the necessary angular momentum then has been passed on proportionately to the celestial companions, with which the cause for evolution and rotation of their own would be clarified. In addition the moon goes away from the earth and the earth again from the sun, so that looking back it by all means would be obvious, if they once had belonged together.

If we assume that cosmic dust particles meet and accumulate, then all collected rubble contributes to the rotation of its own of the forming celestial body. The more matter finds together, the larger its force of attraction gets, the faster it will grow like a celestial vacuum cleaner. In the course of time this process however is slowed down again and eventually comes to a standstill, because as matter condenses, volume and spherical radius decrease and the rotation of its own increases to the corresponding extent. The celestial body rotates faster and faster and reaches at its surface the cosmic velocity vk, which is given by the mass m and the radius r of the star (eq. 12.2). Now the centrifugal force has reached an order of magnitude, for which the celestial body hurls exactly as much matter into space, as it on the other hand collects by its gravitational effect.

Our sun was lucky to have been supplied with neutrinos in the range of influence of our galaxy. It went in resonance and started to grow, this time from out of the inside. It however could not yet shine, because a crust had formed on its surface around its core of fusion and its mantle, a crust on which permanently was falling cosmic matter from the outside. The increasing viscosity of the sun becoming compressed caused a slowing down of the core of the sun and the corresponding acceleration of the mantle and crust.

Titius-Bode law of 1766:

$$a = 0{,}4 + 0{,}3 \cdot 2^{\nu} \qquad (12.5)$$

in astronomical units a with:

$$r_n = a \cdot r_e \qquad (12.6)$$

(r_e = 149 598 000 [km] average orbital radius of the earth)

Planet	*orbital radius acc. to the law:*		*measurement value.*
Mercury:	$\nu = -\infty$	$a = 0{,}4$	*0,39 (measured)*
Venus:	$\nu = 0$	$a = 0{,}7$	*0,72 (measured)*
Earth:	$\nu = 1$	$a = 1$	*1 (by definition)*
Mars:	$\nu = 2$	$a = 1{,}6$	*1,52 (measured)*
Asteroids:	$\nu = 3$	$a = 2{,}8$	-
Jupiter:	$\nu = 4$	$a = 5{,}2$	*5,2 (measured)*
Saturn:	$\nu = 5$	$a = 10$	*9,54 (measured)*
Uranus:	$\nu = 6$	$a = 19{,}6$	*19,2 (measured)*
Neptune:	$\nu = 7$	$a = 38{,}8$	*30,1 (measured)*
Pluto:	$\nu = 8$	$a = 77{,}2$	*39,4 (measured)*
circumsolar cloud of planets:	$\nu = 9$	$a = 154$	-
etc. ... :	$\nu = 10$	$a = 308$	-

Table 12.2: The Titius-Bode series of the planets (the theoretical values compared to the measurement values)

Sometime our like mad spinning sun had increased that much, that the crust came off like the „tread of an old car tyre" and was catapulted into space. The repulsion was achieved by the centrifugal force exceeding the gravitation for the force of cohesion, which at the moment of the separation of crust regions suddenly tears off. Like snowballs the planets lulled off the sun's surface in this process and were hurled away. Their velocity of rotation at this time was identical to the cosmic velocity of the sun v_k and with that for many a planet large enough to produce its own satellites out of its own surface, which perhaps was not yet completely ideally spherical.
With every planet, which the sun gave birth to, it gave away a part of its own angular momentum to its child as orbital momentum. Only from this time on the sun reduced its angular velocity steadily until this very day. By losing the crust it also started to shine openly. Thus at least could our solar system have been formed.

12.2 The birth of the planets

From this observation various consequences result. If stars are observed, which are rotating very fast, then they either are very young, or they have no planets. Stars, which compared to our sun are rotating less fast, have given away the angular momentum to their planets and such, which hardly are rotating, have their planets already sent away into space. But if the last planet leaves its solar system and the sun stops to rotate, then the sun, which meanwhile has grown to a red giant, without a, the spherical form stabilizing centrifugal force, will collapse. The supernova is the death of a star and thereby neutrinos are set free, the material for new life.

After the coming off of the planets these first clear free their flight paths, by together with the sun collecting the flying around matter. Even whole planets thus can collide, are slowed down and form bigger units. Finally only some few planets in very particular orbits are left. Their average distance to the sun obeys in an until now completely inexplicable manner the Titius-Bode series (equation 12.5, table 12.2).
In the case of the by the german scientist Titius 1766 formulated regularity it concerns a rule of thumb founded purely on experience. But it is remarkable, that the planet Uranus could be predicted (Bode 1772) and after systematic searching also be found (Herschel 1781) with it.

The most distant planets Neptune and Pluto however don't obey the law. Their distance should be very much larger. But this circumstance we already had given reasons for with the fact, that for them the resonating interaction already overlaps and exceeds the gravitation in its effect (chap. 10.1 note<ii> and chap. 10.5).

The arbitrary seeming series of numbers 0, 3, 6, 12, 24, 48, 96, 192, 384, ... with a respective doubling of the value, starting with the 3, the addition of 4 and the following division by 10 at first are nothing but pure acrobatics of numbers, which now really has nothing to do with physics (table 12.2). A physical background can be supposed however because of the tried and tested applicability and that should be fathomed.

Orbital angular momenta $J\cdot\omega$ of the n^{th} planet with: $J = m\cdot r_n^2$ and $\omega = v_n/r_n$:

$$J\cdot\omega = m\cdot r_n\cdot v_n \qquad (12.7)$$

	equation 12.3:	equation 12.4:	
By using amounts the orbital angular momentum to dependent	$J\cdot\omega = m\cdot\sqrt{G\cdot m_s\cdot r_n}$ on r_n	$= G\cdot m\cdot m_s/v_n$ on v_n	(12.8)

change of the angular momentum (1^{st} derivation) with the ordinal number n

$$\frac{d(J\cdot\omega)}{dn} = m\cdot\sqrt{G\cdot m_s}\,\frac{d(\sqrt{r_n})}{dn} = G\cdot m\cdot m_s\,\frac{d(v_n^{-1})}{dn} \qquad (12.9)$$

$$\frac{d(J\cdot\omega)}{dn} = \frac{m\cdot\sqrt{G\cdot m_s}}{2\sqrt{r_n}}\cdot\frac{dr_n}{dn} = -\frac{G\cdot m\cdot m_s}{v_n^2}\cdot\frac{dv_n}{dn} \qquad (12.10)$$

with eq. 12.8:

$$\frac{d(J\cdot\omega)}{dn} = \frac{J\cdot\omega}{2\cdot r_n}\cdot\frac{dr_n}{dn} = -\frac{J\cdot\omega}{v_n}\cdot\frac{dv_n}{dn} \qquad (12.11)$$

By comparison of the left and the right solution (of eq. 12.11), after introduction of the constant: $\frac{1}{N}$

$$= \frac{1}{r_n}\cdot\frac{dr_n}{dn} = -\frac{2}{v_n}\cdot\frac{dv_n}{dn} \qquad (12.12)$$

the differential equations read:

$$\frac{r_n}{N} = \frac{dr_n}{dn} \qquad \frac{v_n}{2\cdot N} = -\frac{dv_n}{dn} \qquad (12.13)$$

and the general solutions:

$$r(n) = r_n = r_o\cdot e^{\lambda\cdot n} \qquad v(n) = v_n = v_o\cdot e^{\lambda\cdot n} \qquad (12.14)$$

The 1^{st} derivation and the comparison with eq. 12.13 and eq. 12.14:

$$\frac{dr_n}{dn} = r_o\cdot\lambda\cdot e^{\lambda\cdot n} \qquad \frac{dv_n}{dn} = v_o\cdot\lambda\cdot e^{\lambda\cdot n} \qquad (12.15)$$

$$\frac{dr_n}{dn} = \frac{r_o}{N}e^{\lambda\cdot n} \qquad \frac{dv_n}{dn} = \frac{-v_o}{2N}e^{\lambda\cdot n} \qquad (12.16)$$

determine the coefficient λ:

$$\lambda = 1/N \qquad \lambda = -1/2N \qquad (12.17)$$

The result is for a planet in the n^{th} orbit:

for the average orbital radius	for the average orbital velocity
$r(n) = r_n$	$v(n) = v_n$
$r(n) = r_o\cdot e^{n/N}$	$v(n) = v_o\cdot e^{-n/2N}$
(12.18)	(12.19)

Fig. 12.3: Calculation of the distances and orbital velocities of the planets

12.3 The derivation of the Titius-Bode law

Even if Bohr's atomic model should be wrong, it gladly is compared to the system of the planets. The radii of the electron orbits mathematically result as eigenvalue solutions of the Schrodinger equation, and that we have derived from the fundamental field equation (chap. 5.1, eq. 15) (chap. 5.5 - 5.9). The orbital radii are calculated in increasing order in accordance with the sequence of whole numbers with n = 1, 2, 3, 4, ...

From the same sequential regularity of the planetary orbits can be derived, that they also obey the eigenvalues of the same fundamental field equation, which isn't called a world equation in vain. The quantitative distances from the sun are determined by the size of the sun: if the sun increases, then also all distances increase to the same extent.

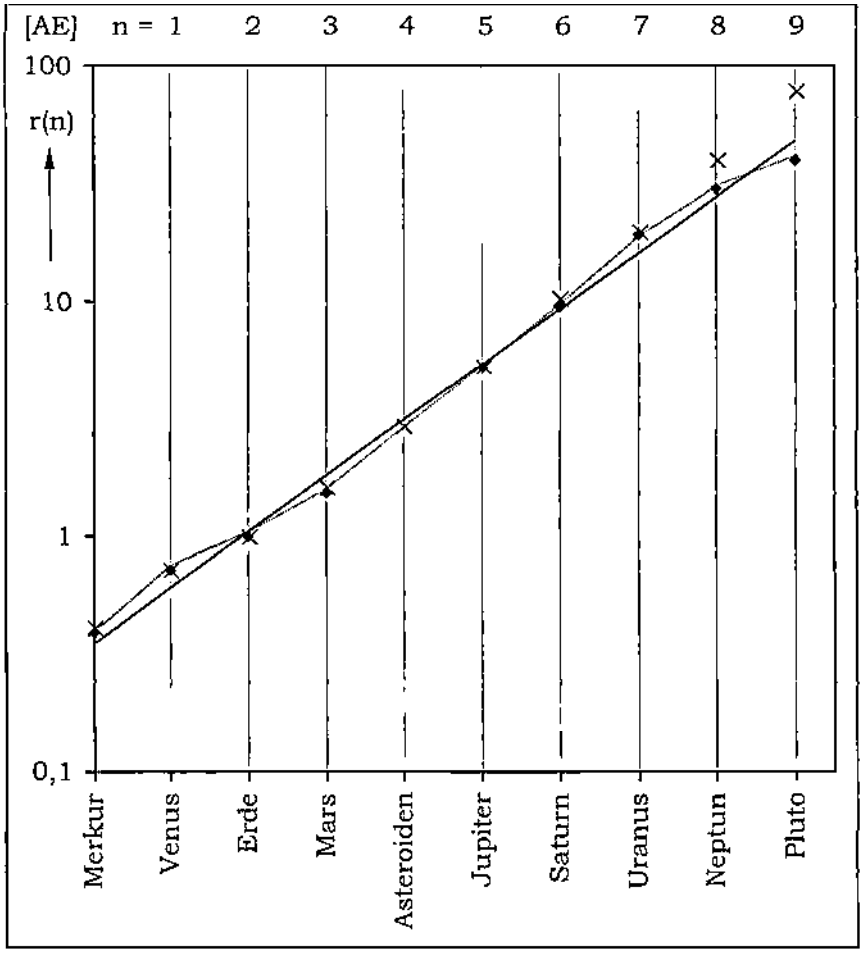
Now result identical distances between the orbits from Bohr's model, whereas this distance in the case of the planets with increasing distance from the sun gets larger. The reason for this unevenly grading can be calculated just like that (fig. 12.3).

We arbitrarily pick a planet, which occupies the orbit n, where n again represents the sequence of whole numbers (n = 0, 1, 2, 3, ...). If the orbit of this n^{th} planet changes, then also its distance to the sun $r_n = r(n)$, its orbital velocity $v_n = v(n)$ and the orbital momentum $J \cdot \omega$ (12.7) are changed.

We try (as in equation 11.42, fig. 11.10) the balance of forces between centrifugal force and gravitational force (eq. 12.1, fig. 12.1) and solve equation 12.2 for the orbital velocity. The orbital angular momentum of the planet written down once in its dependency on r_n and in the right column next to it on v_n (eq. 12.8, fig. 12.3), is derived for the orbital ordinal number n, to record the change in angular momentum (equations 12.9 to 12.11).

In fig. 12.3 the paths to the solution for both cases are given. For the average orbital radius r(n) as well as for the average orbital velocity v(n) of the planet an exponential course (eq. 12.18 and 12.19) and in logarithmic representation a straight line (fig. 12.4) results.

Even the orbits of the distant planets Neptune and Pluto, for which the Titius-Bode series fails, now are correctly recorded, so that with good cause can be claimed, to correctly have derived the regularity of the distances of the planets physically and mathematically.



× × without line (×): values according to Titius-Bode
dotted line: measured distances
drawn line: calculated distances

Fig. 12.4: Representation of the distances of the planets

result of the calculation:

$$r(n) = 0{,}3332 \cdot e^{\left(\frac{n}{1{,}82}\right)} \quad [AE] \qquad (12.20)$$

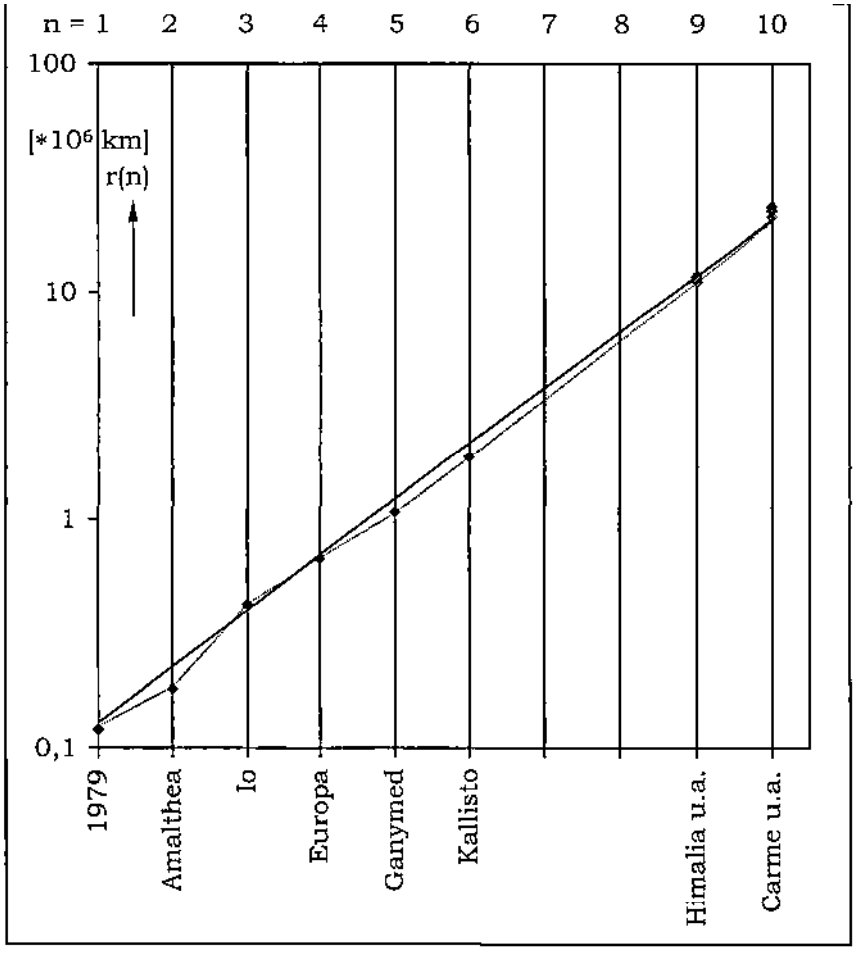
12.4 The hollow planet

The numerous accompanying moons of the big planets obey in the same manner as the planets this regularity, so that for the found result every coincidence is excluded. The orbits of the moons of Jupiter (fig. 12.5), of the moons of Saturn (fig. 12.6) and of the moons of Uranus (fig. 12.7) in logarithmic representation lie almost on a straight line. Some orbits certainly are occupied several times, while many an orbit has remained unoccupied. Other orbits again are occupied by a ring of countless chunks of rock, so-called planetoids. Best known representative is the asteroid belt (n = 4) between the orbit of Mars (n = 3) and that of Jupiter (n = 5). The Titius law requested the planet "Aster", but what one found (Piazzi, 1801), at first only was Ceres, the biggest representative of the small planets.
As a second asteroid, as they are called, was found (Olbers 1802) its discoverer proposed the explanation that both, Ceres and Pallas, could have formed in a cosmic catastrophe, which a bigger celestial body had suffered.
Perhaps the sought-for planet Aster actually had imploded after a collision and had been torn apart in countless fragments, of which today still more than half a million pieces are flying around. Most of the fragments however have been collected by the neighbouring planets Jupiter and Mars. Also in the case of the moons of Mars and the outer moons of Jupiter it could concern scrap of Aster. Some presumably fell on the young earth and triggered natural disasters and left deep scars.

It can be imagined that the planet Aster was hollow from the inside and thus was built up similar to the moon. Such a hollow sphere could have formed, if the sun, or in the case of the moon, the earth still was rotating with the cosmic velocity and as a result of the centrifugal force at the perimeter parts of the crust came off as connected sheets and rolled up to a tube.
The fast spinning tube then remodels into a hollow sphere with openings at the poles. In the inside of the sphere, near the equator, protected conditions and the best prerequisites for an undisturbed development, for instance of intelligent living beings, are found by the way. Apart from the advantages the hollow sphere however has as a fundamental disadvantage, that the normally protecting shell in the case of a collision with a bigger celestial body can becomes instable and can implode.

In the case of the moon the pole openings in the meantime are closed and a presumed gas pressure in the inside in addition provides stability. The wall of the spherical shell however is not evenly thick, so that the moon all the time turns the same, namely the heavier, side towards the earth. In view of the seismic measurements of the Apollo-missions, which revealed an extremely small damping of the ground of the moon (chap. 11.9, note <i>), we should look after our moon well, because a comet, which lets the moon implode, would be able to bring about more damage on earth, than if it would hit the earth directly.

Should there exist a hollow and possibly even on the inside habitable planet in our solar system, then surely Saturn should be considered. Its density is smaller than that of water, so that water would be distributed over the inside area of the hollow sphere, if it would be existent. One should examine more detailed the extremely flat pole regions of Saturn for possible openings! Also Uranus and Neptune are possible candidates. This only is thought as an idea.



dotted line: measured distances
drawn line: calculated distances

in position n = 9 stand: Leda, Himalia, Lysithea and Elara
in position n = 10 stand: Ananke, Carme, Pasiphae and Sinope

Fig. 12.5: The distances of the moons of Jupiter

Result of the calculation:

$$r(n) = 67608 \cdot e^{\left(\frac{n}{1{,}743}\right)} \text{ [km]} \qquad (12.21)$$

<i>: Note to chapter 12.5:

What we observe as and call cosmos, is nothing but a structured state of space.

12.5 Concerning the formation of the universe

The widespread concept of an expanding universe bases on the observation of a red shift of the spectral lines of galaxies, which increases with their distance. As the physical explanation for the discovery of Hubble, the Doppler shift for a light source, which is moving away from us, is used. But this concept of an against the attraction of the gravitation taking place expansion is nothing more than a work hypothesis.

The by Christian Doppler in acoustics investigated effect treats the observable shift in frequency, if the source of sound or the receiver is moved with regard to the medium of propagation. But according to today's version there doesn't exist such a medium at all for light, because Einstein has abolished the concept of the aether. According to that the Doppler effect neither can be applied to changes in light frequency.
In the case of the expanding universe, for a decrease of the density and the tracing back to a Big Bang, it therefore should concern a misinterpretation!

Here another effect has to take effect, which one is not yet clarified. Perhaps the changing field relations of the observer environment play a role, after the earth moves away from the sun. But perhaps the galaxies only influence the propagation of their own light, or the light ray on its millions of years lasting way through space slightly loses energy, what is expressed by gradually increasing its wavelength and shifting its spectrum towards the red frequencies.
The hypothesis of the Big Bang moreover contradicts every causality. It is not able to give an answer concerning the origin and the future of the universe and on the question of the origin of the energy and the particles. With that its physical value of explanation goes towards zero.

If we again hold the theory of objectivity against the theory of relativity (part 1), we come to quite other answers. Here apart from the waves also vortices are found. Specially in the case of the spherical vortex a part of the wave power is enclosed in the inside, so that looked at from the outside a from zero differing energetic state results, which even is accessible measuring technically (chapter 6.2).
Wave and vortex are two possible forms of state, so that for the conversion of one state in the other state at first no energy is necessary. The change of state depends on the local field relations.
If we assume that in the beginning the cosmos was free of energy and particles. Then the first vortex was a possible product of chance with an infinite extension. This first spherical vortex, which was contracted under the potential vortex pressure, gave structure to space, gave it energy and field and took care for the rolling up and formation of new vortices<◁▷>.
It can be assumed, that even today new particles continually are being formed in the fringe areas of the infinitely extended cosmos, which fly towards us and in doing so contract. They are attracted and at the same time shrunk by the fields of the celestial bodies. They form the source of all matter and energy for our observable universe, which permanently is changing its structure. Because the same oscillation with reversed sign is enclosed in the inside of the spherical vortex, the sum of the energy present in the cosmos is exactly equal to zero. With that the question concerning the causality is superfluous.

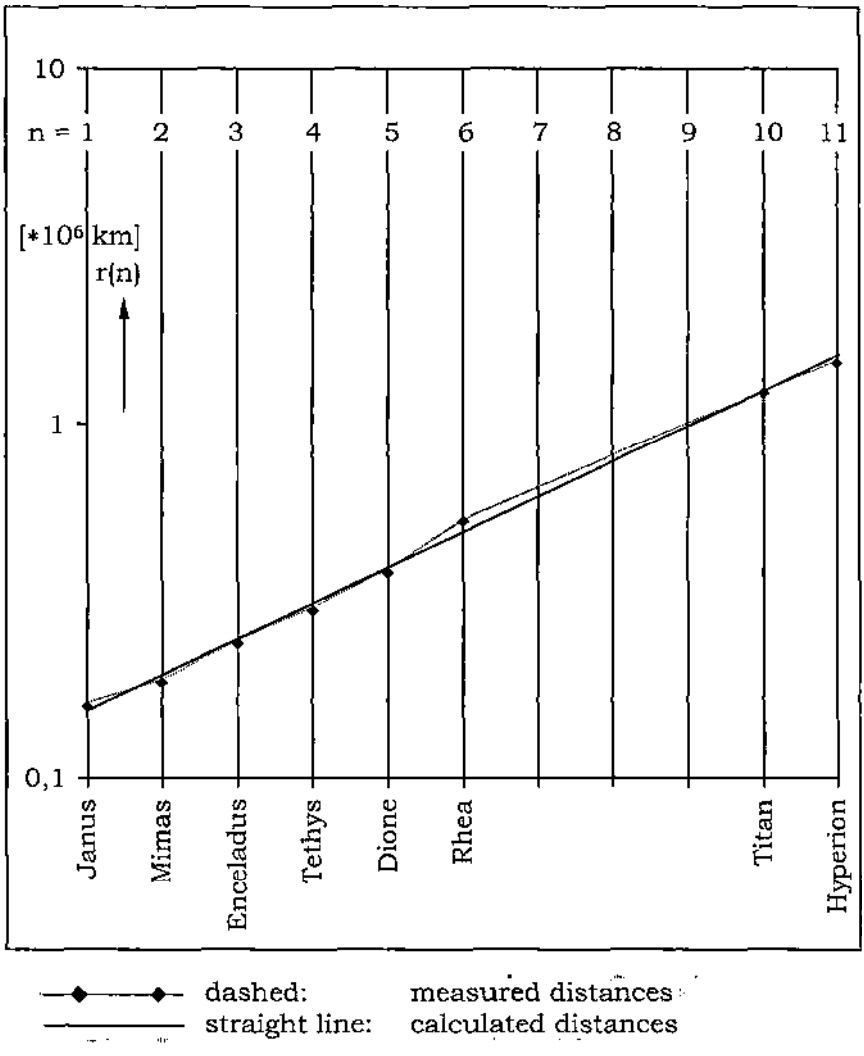


Fig. 12.6: The distances of the moons of Saturn

Note to chapter 12.6 (2nd law of thermodynamics<i>):

Heat cannot completely be transformed into mechanic or electric energy.

<i>: see Electromagnetic environmental compatibility, Part 1, fig. 8.4

The formation of the universe also can be explained causal and completely without a hot Big Bang, even if a supernova surely represents something like a "local Big Bang" for the concerned celestial bodies. According to the observations of the sky expansion and contraction, explosion and implosion occur everywhere in form of oscillations.

On the whole the expanding universe, which once was in thermodynamic equilibrium with matter, should cool down further and further. But stop, the 2nd law of thermodynamics teaches one just the opposite. If the entropy only increases, as the law dictates, then the whole universe should end in a heat death, just as mysteriously and inexplicable, as it should have been formed with the Big Bang. Perhaps something is wrong with the law (fig. 8.4)?

12.6 Counter examples concerning the 2nd law of thermodynamics

Most likely a small experiment convinces us. We heat two spheres, one somewhat less, the other somewhat more. Then we focus the heat radiation of the less hot sphere with help of a parabolic mirror and point it to the hotter one of both. That as a result becomes hotter, whereas the colder is cooled down. The heat thus has flown from the colder to the hotter sphere. Is it allowed to do that?
According to the 2nd law of thermodynamics it of course isn't. There the heat always can only flow from the hot to the cold sphere. But in this primitive experiment it measurable and verifiable flows in the wrong direction. Here the entropy, which is said to always only increase, actually decreases. Here entropy is being destroyed!
Shall we now let the carrying out of the experiment be forbidden under threat of penalty or shall we secretly put the law of entropy to sleep? It can't be denied that this law until now has quite well helped us along, at least for terrestrial processes, at least if one dispenses with the poor inventors, whose inventions offend against the since 100 years tried and tested 2nd law of thermodynamics. They haven't really arrived at the patent office at all, then they already are outside at the door again. Such inventors with their illegal behaviour even today must feel like criminals.

Just what that observed experiment can, each refrigerator and each warmth pump is using as well. And it is not an isolated case: also our sun clearly functions and operates illegally! The surface temperature amounts to only 5800 degrees Kelvin and supplies the atmosphere of the sun with energy. The energy thus flows from the sun to the corona, and that is with values above 1,000,000 degrees Kelvin for some powers of ten hotter!

Only the vortex concept resolves the many question marks without compulsion. In the case of the sun certainly vortices are at work. Here the high temperature in the corona arises as a result of vortices falling apart. We also speak of eddy losses. The transport takes place by heat radiation, exactly as in the experiment with the two spheres.
The possibility exists therefore in vortex processes as well as in technical circle processes that heat could flow from the colder to the hotter sphere. Whether this is an offence against the 2nd law of thermodynamics, is in the end a question of interpretation of the law and up to the opinions of the scholars.

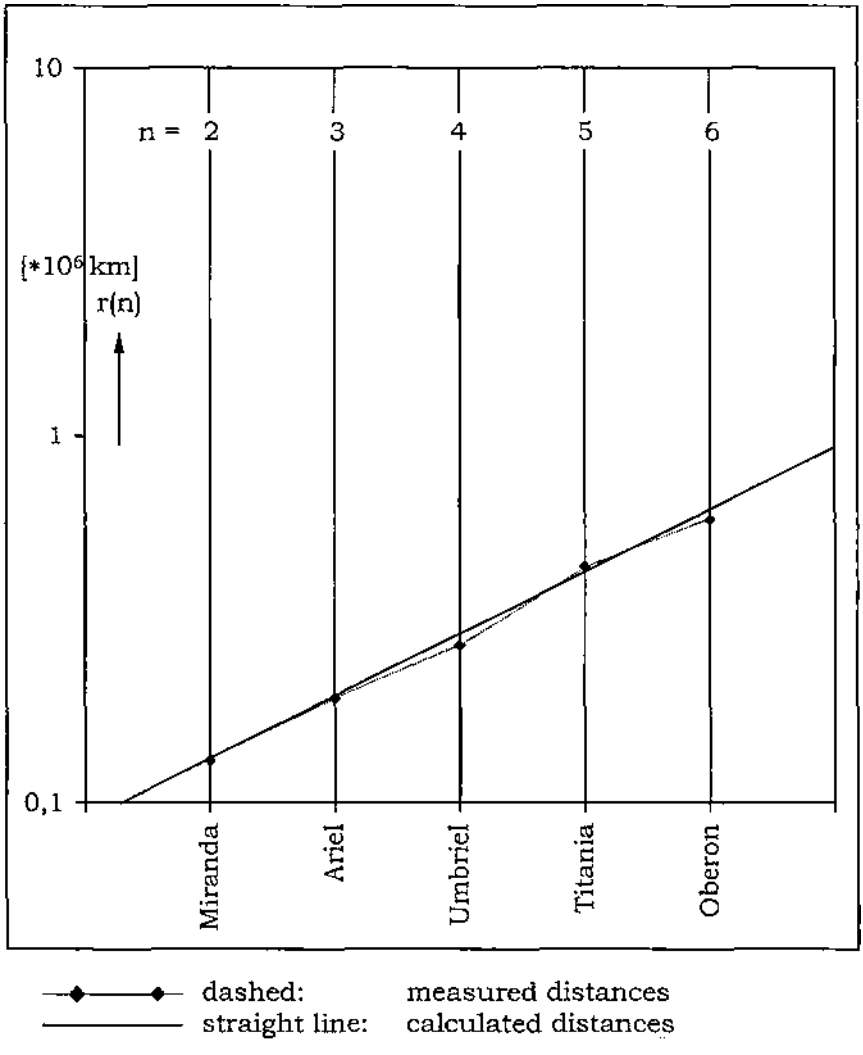


Fig. 12.7: The distances of the moons of Uranus

Note to chapter 12.7 (law of entropy):

The entropy of a closed system never can decrease. It is increased in the case of all irreversible processes. In the case of reversible processes it remains constant.

12.7 Entropy destroying potential vortices

Vortices in addition can amalgamate to balls and to planar vortex systems (4.9 and 4.10). In that case similar consequences, as they can be observed in flow-technical potential vortices in hydrodynamics, can be expected. As a result of the concentration effect (4.1) and because of the conservation of angular momentum an increase of the velocity of rotation of the vortex occurs. Like in the case of the pirouette in figure skating a spontaneous acceleration of its own is observed. In that way the kinetic energy of the system is increased, and that has to come from somewhere.
If we don't supply the contracting vortex with any additional energy for the increase of its rotation of its own, then as a source of energy only the heat energy is left. For this reason every contracting vortex generally converts heat in kinetic energy, it therefore cools down its environment! It moreover destroys entropy and offends against the 2nd law of thermodynamics (fig. 12.8).

It isn't an accident, if in the inside of a tornado it starts to hail. The whirlwinds really furnish visual instruction of the contraction and acceleration of their own of ring-like vortices. If then, even in tropical regions, hail stones are formed, the cooling effect has to come from somewhere, and it can be assumed that the vortex withdraws the heat energy from its environment (calculation in fig. 12.8).

If in specialist books is talked about matter or stars condensing, then vortex physics teaches us that they in reality are contracting and by doing that cooling down. That also is valid for whole galaxies. We owe solely the vortex laws that the continual heating by absorption of radiation is prevented and our sky in the night is dark and doesn't shine as light as day.

The cosmic background radiation, which as a result of vortices lies at almost 3° Kelvin, actually can only be given account for with a contracting of vortices of the Milky Way galaxy. If the cooling down in a compression resp. condensation process has arrived at absolute zero, the vortex becomes stationary, the contraction becomes dependent on the irradiated energy or it wholly comes to a standstill without supply of energy. An example for that is earth's inner core, which at zero Kelvin can't contract further.

From the point of view of causality it is suggested that we galactic and perhaps even cosmic to a large extent are in thermodynamic equilibrium, completely without Big Bang and heat death<i>.

Numerous inventions, as mentioned, are based on the principle of converting environmental heat in useable energy by contraction of vortices. If however the inventors don't know the vortex laws and if they have developed their concept empirically and less physically, then it very often happens that erroneously gravity is made responsible, then is talked of gravitational converters, of the use of a gravitational field energy. But the inventors don't do themselves a favour with that.

<i>: In the seminar it is desired to think about this. Doing so the philosophical faculty may feel as well addressed, as the sandpit of physics, in which completely unsuspecting is played and juggled with Big Bang hypotheses by ignoring all physical regularities and every common sense.

Evidence to counter:
planar, contracting ring-like vortex

conservation of angular momentum: $J \cdot \omega = m \cdot r \cdot v = \text{constant}$ (12.7)

conservation of energy: $E_{kin} = \frac{1}{2} m \cdot v^2 = \text{constant}$ (12.22)

	before (r_1, v_1)		afterwards (r_2, v_2)	
contracted ($r_2 < r_1$):	$m \cdot r_1 \cdot v_1$	=	$m \cdot r_2 \cdot v_2$	(12.7*)
with the consequences:	v_2 / v_1	=	r_1 / r_2	(12.23)
and: kinetic energy:	$E_{kin1} = \frac{1}{2} \cdot m \cdot v_1^2$	=	$E_{kin2} = \frac{1}{2} \cdot m \cdot v_2^2$	(12.24)

increase of the kinetic energy:

$$\frac{Q_2}{Q_1} = \frac{E_{kin2}}{E_{kin1}} = \frac{v_2^2}{v_1^2} = \frac{r_1^2}{r_2^2} \qquad (12.25)$$

notice: *Because of the change in energy/heat* ***no adiabatic change of state!***

change of volume: with $V = \pi \cdot r^2 \cdot h$

$$\frac{V_1}{V_2} = \frac{r_1^2}{r_2^2} \qquad (12.26)$$

notice: *Because of the change of volume* ***no isochore change of state!***

assumption: ***isobar change of state*** *(with p = const., Gay-Lussac):*

result: (vortices of gas) involved with the:

$$\frac{T_1}{T_2} = \frac{V_1}{V_2} = \frac{v_2^2}{v_1^2} = \frac{r_1^2}{r_2^2} \qquad (12.27)$$

* ***acceleration*** $v_2 > v_1$ *is the contraction of vortices* $r_2 < r_1$, $V_2 < V_1$

* ***the cooling:*** $T_2 < T_1$ and $\Delta T = T_1 - T_2 = T_2 \cdot \left(\frac{r_1^2 - r_2^2}{r_2^2}\right)$ (12.27*)

* ***withdrawal of heat*** $Q_2 - Q_1 = \Delta Q = Q_1 \frac{\Delta T}{T_2} = Q_1 \cdot \left(\frac{r_1^2 - r_2^2}{r_2^2}\right)$ (12.28)

* ***and entropy destruction:*** $\Delta S = C_p \cdot m \cdot \ln\left(\frac{T_2}{T_1}\right) = C_p \cdot m \cdot \ln\left(\frac{r_2}{r_1}\right)^2$ (12.29)

Fig. 12.8: The cooling and entropy destroying effect of contracting potential vortices (calculations concerning chapter 12.7)

13. Recording of space and time

If observations should force us to touch the sacred physical laws, then we should first of all judge our measuring technique critically of all sides and bring it in an usable state. I suggest, we start completely from the beginning with the devices, with which the dimensions of space and time are recorded, with the tape measures for the measurement of length and the chronometers, our clocks.

We must find out, why comets are slowed down if they approach the sun like by the hand of a ghost and in going away again are accelerated, although no forces at all act on the celestial bodies from the outside.

We must find out, why in mines deep under the earth another value for the gravitational constant is being measured as on the surface of the earth<i>. The results hardly can be imagined, if an universal constant should lose its constancy.
Thereby can Newtonian mechanics and the well-known laws be used very successfully from today's point of view, as the derivations in the last chapters have shown. We even could verifiably and mathematically correct calculate the growth of the earth and the solar system with them. The physical laws in the normally used formulation in spite of that seem to be bound to certain limits. Some observations contradict all experience<ii>.

<i>: H. Schuh: Eine Konstante verliert ihre Konstanz; neue Experimente nahren Zweifel an Newtons Gravitationsgesetz, Die Zeit Nr. 40 vom 25.09.97. From it the following quotation (translated):
„It already is suspected for several years, that a fifth force could exist, this suspicion goes back to exact measurements of the gravitational constant G in Australian mines and shafts. Physicists of the University of Queensland in Brisbane had determined, that G for measurements underneath the earth is about one percent larger than the corresponding, since centuries in laboratories determined size. Their proposal for explanation, namely a fifth repelling force, at first met with sharp disapproval. But an at 21 august in the journal Science (Bd. 237/87, P. 881) published work, which bases on measurements in a drilling hole in Michigan, confirms the Australian data".

<ii>: Already the nobel prize winner of physics, Lenard, pointed to the circumstance, that the relativistic representation of the astronomical aberration is incorrect, after no distinguishable aberration could be observed at binary stars, as it had been expected. With that Lenard by the way also has confirmed the existence of an aether.
P. Lenard, Annalen der Physik, Bd. 73, S. 89 (1924)

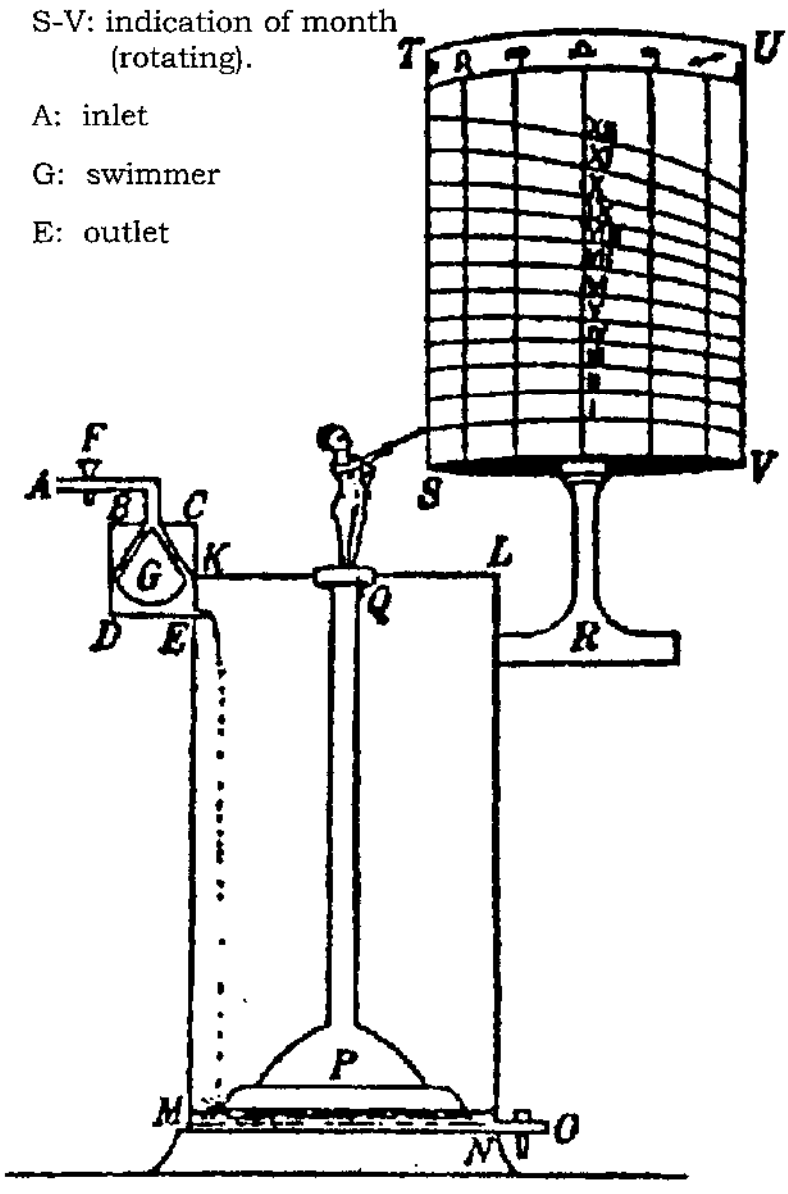


Fig. 13.1: The water meter of the Ktesibios (approx. 250 BC)
(with regulation of the water-level)

13.1 The measuring technical debacle

We are standing for a measuring technical debacle, because we have fixed our calendar to the rotation of its own of the earth. We call a 360° turn a day, divide it in 24 hours of 60 minutes each and every minute in 60 seconds. With that we determine the duration of a second.
A clock according to this definition only then is exact, if it follows the changes of the eart h to the same extent. Obviously this in particular is the case for atomic clocks. An objectively seen precise going clock however would land at the waste disposal site as completely unusable.
Alter all nobody wants to know, how late it really is. Everyone only wants to find confirmed his subjective feeling, and our experience of time simply is directed after the course of the sun, thus after the rotation of the earth!

For the moment and as an approximation also for the life time of a person, this determination of time may be sufficiently exact, but seen over larger periods of time, one doesn't get around a conversion. Actually the 200 million years since the beginning of the Creation on the mentioned primeval hill are considerably less long ago. The earth and the whole solar system are very much younger, than was assumed until now!

If we as an example again take the cited research group of the University of Arizona (chap. 11.10<i>), which by means of an analysis of sediment formations have found out, in accordance with our calculation, that 900 million years ago a day only had 18 hours<i>. Such traces in geological deposit layers can be very informative, if they are analysed correctly, since here the measurement technician himself is not subject to the process. He stands outside and hence can exactly measure the time difference.
If a geologist of that time had looked at his watch during the formation of the layers, then a day obviously would have had 24 hours, and he wouldn't have been able to understand the whole excitement at all. The accusation, he would suffer from chronic blindness caused by his job, he of course would repel resolutely. Can you now imagine, from which disease our science of today suffers?

Our chronometers are nothing but the improved model of a sundial<ii>.

We live in the dimensions of space and time, but we quite obviously have the biggest possible difficulties with the dimensioning of both. Possibly we already aren't capable of that at all by principle. Most suitably we clarify the situation by means of examples concerning the two problem spheres.

Let us at first stay at the dimension of time. It may have become clear, how problematic the chosen determination of the time scale in seconds is and which contradictions can result if larger periods of time are considered. More and more often science fiction authors romp about on the playground of time, fantasize about some time travel, or they occasionally make jokes about it<iii>.

<i>: 900 million years ago a day had 18 hours, Washington (dpa) 1997.
<ii>: There also exist models, of which is asserted, they go according to the moon.
<iii>: A passenger, who got on the 10 o'clock bus, passes by the church steeple clock, which only reads 5 to 10 and curses: Damn, I took the bus in the wrong direction!

Centrifugal force $F_{1,2} = (m/R)\cdot(v_E \pm v_f)^2 = m\cdot R\cdot(\omega_E \pm \omega_f)^2$ (13.1)

with: $R = 6378$ [km] (radius of the earth),

$v_E = \omega_E \cdot R = 0{,}465$ [km/s] (rotational speed of the earth), (11.20)

$v_f = \omega_f \cdot R = \pi \cdot R/t_o$ (speed of the plane) (13.2)

and: t_o [s] (duration of journey)

energy of the moving steering quanta:

$$E_{1,2} = \int_0^R F_{1,2}\, dR = m \int_0^R R\cdot(\omega_E \pm \omega_f)^2\, dR = \quad (13.3)$$

$$E_{1,2} = \frac{1}{2}\cdot m\cdot R^2\cdot(\omega_E \pm \omega_f)^2 = \frac{1}{2}\cdot m\cdot(v_E \pm v_f)^2 \quad (13.4)$$

energy balance (generally of a quantum of radiation):

$E_{1,2} + E_q = E_{ges}$ resp. $E_{ges} - E_q = E_{1,2} = \Delta E$ (13.5)

in general: $E = h \cdot f = m\cdot c^2$ resp. $m = h\cdot f/c^2$ (13.6)

and specifically: $\Delta E = h\cdot\Delta f$ = $E_{1,2} = h\cdot f\cdot(v_E \pm v_f)^2/(2c^2)$ (13.7)

(Gl. 13.4 mit 13.6):

$\Delta f/f = \Delta t_{1,2}/t_o$ resp. $\Delta t_{1,2} = t_o\cdot\Delta f/f$ (13.8)

(eq. 13.7 inserted into eq. 13.8)

resulting in: $\Delta t_{1,2} = t_o\cdot(v_E \pm v_f)^2/(2\cdot c^2)$ (13.9)

time of travel around half the earth: $t_o = \pi\cdot R/v_f$ (13.2)

results in a difference in going of: $\Delta t = \Delta t_1 - \Delta t_2$ (13.10)

$$\Delta t = [(v_E + v_f)^2 - (v_E - v_f)^2]\cdot\pi\cdot R/(v_f 2\cdot c^2) \quad (13.11)$$

result calculated: $\Delta t = 2\cdot v_E\cdot\pi\cdot R/c^2 = 207$ [ns] (13.12)

measured by Hafele and Keating<i>: 214 [ns]! (13.13)

Fig. 13.2: The difference in going of two atomic clocks (caesium resonant clocks)

<i>: Hafele-Keating-Experiment, Oktober 1971; s. a. W. Bauer: Klassische Physik, Graphia Druck, Salzburg (1975), Eigenverlag

13.2 The clock paradox

The theme „time dilatation" in connexion with the particle decay already has been treated (part 1, chapter 6.20). It has been shown, that a fast moving and with that length contracted particle to exactly the same extent (Lorentz's square root) becomes more stable and longer-living. If relativists pack an atomic clock based on radioactive decay in a plane and detect a difference in going between the one, which has been flown around and a second identically constructed clock, which has stayed at the ground, then they have with that detected experimentally a very small length contraction, which really occurred, and by no means a time dilatation, as they claim.

Now we in addition owe Einstein, that the aether has been abolished and from that follows, that it can't play a role in which direction the plane flies. If therefore both clocks are taken along each in a separate plane, one plane flying to the west and the other to the cast, both planes meeting again for the first time on the other side of the globe, then according to Einstein's theory it shouldn't be possible to determine a difference in going, if both planes constructed identically were on the way with the same velocity. But this is not the case!
Actually a difference in going is measured, which however can't be calculated with the theory of relativity, yes, which is completely incompatible with this theory and clearly brings anyone to the eye, that the effect actually can't have to do anything with a time dilatation, that the moving clocks merely go wrong and we have to ask us, why<◁▷>.

These experiments were carried out with atomic clocks, which are constructed as caesium resonators and work with an exactness of one second in 300000 years. As a resonator serves a quartz crystal, which is controlled by an ion current of caesium atoms, which have lost their outermost enveloping electron. The system is fed back, because the oscillating quartz controlled by the caesium ions again adjusts the caesium vapour by radio wave and finally its own atomic controlling current (fig. 13.7).

The reason for the measured difference in going is seen in the field and here specially in the different gravitational field. The centrifugal force directed opposite to the gravitational force at least is not the same, because for a westward flight along the equator the speed of the plane v_f should be subtracted from the velocity of rotation of the earth v_E, whereas in eastward direction it should be added (eq. 13.1).
For the steering quanta supplied by the caesium resonator now the energy balance is put up (13.5 with 13.4) and the change of the reference frequency is calculated (13.7). With the change in frequency is connected directly a change of the at the two clocks readable times $t_{1,2}$ (13.8). For a journey around half the earth, where one clock is flown westwards and the other one eastwards, the difference in going should, according to the calculation, amount to 207 ns. Interesting of the result (13.11) undoubtedly is, that the velocity of the planes doesn"t play a role. It is cancelled out.

October 1971 caesium atomic clocks were sent around the world in scheduled planes in the Hafele-Keating experiment. To be able to estimate the inaccuracy in going of the clocks and with that the measurement error, four clocks were used. Between the westward journey (273 ±7 ns) and the eastward journey (59 ±10 ns) a difference in time of 214 nanoseconds was determined. This under strict scientific conditions determined result once more proves the correctness of the theory of objectivity by confirmation of the calculated value. That however is not valid for the special theory of relativity, because that doesn't appear in the calculation at all!
Who now believes, we would have less problems with the dimension of space, I must disappoint. The determination of the linear measures equally ends in a fiasco.

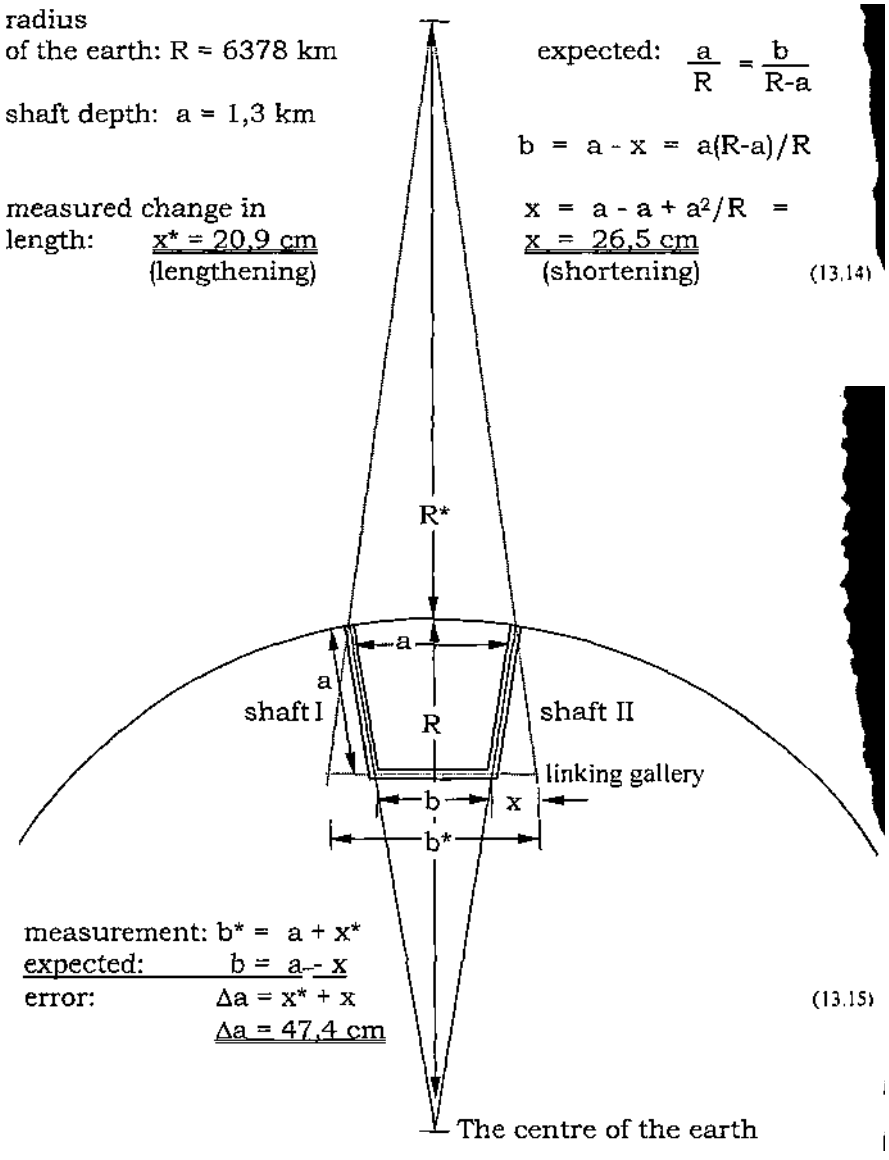


Fig. 13.3: Expectation and measurement in the Tamarack mines
(The curvature of the earth and the length of the shaft a are drawn strongly exaggerated for clarification)

13.3 The Tamarack mines experiment

As long as the ,,foot measure" depended on the shoe size and the ,,cubit" on the forearm of the tailor, the world still was OK. The sciences however request a reproducible quantity for comparison, and that can be fetched at the Bureau International des Poids et Mesures in Sevres near Paris. The original meter is a Platinum alloy. Because the length of the metal always depends on temperature, it is stored at a constant kept temperature of 0° Celsius. Now there in addition still exists a field dependency, an electrostriction resp. magnetostriction. And how is the measurement bar behaving, if the earth grows and the density increases? Is it then shrinking just like other objects in its environment? At this point already chaos is proliferating.

The newest definition of the length measure meter acts as a blow for liberty and thus marks the abyss, at which we are standing: The length is determined by means of a measurement of transmission time of an electromagnetic wave, e.g. of a light signal. It is said that with this determination a higher reproducibility should be obtained. Actually a photo optical facility to measure length is as exact as the built-in facility to measure time, and there we use it again, our sundial. In addition a constancy of the speed of light is taken as a prerequisite, and that is given in meters per second. From a change of the speed of light for forinstance 10% a change in length for 10% as well would result<i>. Because we see this process with the help of our eyes as well with the speed of light, we never can see the change. We neither can technically measure it, because all gauges we construct are built up corresponding to our sensory impression. We ourselves have shovelled the hole, in which we fall.

Only if we succeed in taking a neutral standpoint outside of the events, the true relations will become visible to us. For the field dependency of the space measures a very clear experiment has been carried out, of which I now want to report<ii>.

1901 the French government was offered the possibility to carry out an experiment in the shut down Tamarack mines near Calumet (Michigan) with the goal to determine the diameter of the earth more exact. For that the geophysicists let down two plumb-lines of 27.2 kg each in two perpendicular winding shafts, which were at a distance of 1.3 km from each other. The plumb-lines were tied to hardly expandable piano wires of as well 1.3 km length. It now was expected, since the plumb-lines hung in direction of the centre of the earth, that in a linking gallery between the two shafts a length of (1.3 - x) km should be measurable. From the shortening x one wanted to infer the diameter of the earth (fig. 13.3). But it came completely different.
Instead of a shortening a lengthening for x* = 20.9 cm was measured in the gallery! The point of intersection of the lines through the two shafts had to be not in the inside of the earth, but in space! Immediately ,,hollow earthers" appear, who claim we would live on the inside of a hollow world<ii>. Perhaps one should shoot them to the moon, because from there the earth without doubt is seen as a sphere. Obviously we aren't dealing with a surprise of a fair, but with a fundamental measuring technical problem.

<i>: for that see also part I, chapter 6.11 and 6.12
<ii>: http:/www.t0.or.at/subrise/hollow.htm

Volume of the globe: $V = (4/3)\cdot\pi\cdot R^3$ (13.16)

and of the inner sphere in depth a: $V_a = (4/3)\cdot\pi\cdot(R-a)^3$ (13.17)

resulting in the relative change:
$$\frac{\Delta V}{V} = \frac{V-V_a}{V} = 1-\left(\frac{R-a}{R}\right)^3 = 1-\left(1-\frac{a}{R}\right)^3 \quad (13.18)$$

from $m = V\cdot\rho$ for a constant density ρ (13.19)

and[iii]: $m = \phi/\sqrt{G\cdot 4\cdot\pi\cdot\mu} = A\cdot\mu\cdot H/\sqrt{G\cdot 4\cdot\pi\cdot\mu}$ (13.20)

follows: $m \sim V \sim H$ (13.21)

resp. the relative change:
$$\frac{\Delta H}{H} = \frac{\Delta m}{m} = \frac{\Delta V}{V} = 1-\left(1-\frac{a}{R}\right)^3 = \underline{0{,}061\%} \quad (13.22)$$

According to the theory of objectivity the length of the measurement wire is field dependent[ii] with:

$$H \sim 1/a^2 \quad \text{and} \quad H_a \sim 1/(a-\Delta a)^2 \quad (13.23)$$

and the relative change:
$$\frac{\Delta H}{H} = \frac{H_a-H}{H} = \left(\frac{a}{a-\Delta a}\right)^2 - 1 \quad (13.24)$$

Shortening of the rule Δa is calculated from the comparison of equations 13.22 and 13.24:

$$\frac{\Delta H}{H} = 1-\left(1-\frac{a}{R}\right)^3 = \left(\frac{a}{a-\Delta a}\right)^2 - 1 \quad (13.25)$$

$$\Delta a = a\cdot(1-1/\sqrt{2-(1-a/R)^3}) \quad (13.26)$$

$\Delta a = 40$ [cm] (result of the calculation)

$\underline{\Delta a = 47}$ [cm] (measurement value for comparison, 13.15)

Fig. 13.4: Calculational verification of the measured shortening

13.4 Field dependent linear measure

If a measurement result delivers just the opposite, as was expected by the experimentators, then the layman is amazed and the expert is surprised, at least at first. But then, out of a feeling of panic, the whole view of life could collapse, as many as possible scientists and renowned professors are being informed and integrated, if they want it (Prof. Mc.Nair) or not (Prof. Hallock, Columbia University) and eventually the matter is buried third class and a guise of silence is spread over it. The censorship of the scientific making of opinion in advance doesn't permit publications, which are not in accord with our view of life, out of the animal survival instinct<i>.

A science, which deserves this name, should look different. There it must be permitted, to ask questions and to publicly discuss about it.
I proceed from the assumption, that the earth is a sphere, which we inhabit from the outside; I have no doubts about that. With this as a prerequisite there is only one possible answer to the Tamarack mines experiment: The 1.3 kilometres long measurement wire, which in the gallery in a depth of 1.3 km had to jut out for 26.5 cm, instead is too short for 20.9 cm, from which immediately follows that it, howsoever, is shrunk for 47.4 cm in the depth.
At first of course the experiment was checked for possible measurement errors. The shafts were covered to exclude any draught. The measurement path was optically checked, but the result remained unchanged. But if the cause for the unexpected result doesn't lie in the experiment, then theoretical physics is addressed, after all it is still the experiment which shows us the physical reality and not some theoretical model concept.
In the 1st part of the book already the derivation of a useful explanation is found: The speed of light and with that also the linear measure depends on the field<ii>. The measurement wire accordingly gets shorter, if it is exposed to a larger field strength (eq. 13.23). We can verify the measured shortening calculative (fig. 13.4).
For that we at first determine the change of the field strength, as it is to be expected in a depth of 1.3 km. We here are dealing with the closed H field lines, which are responsible for the gravitation. In a past derivation it has been shown, that a gravitating mass can be converted into a magnetic field<iii>. Between a mass m and a field strength H hence exists a proportionality (13.21), in the same way as between the same mass and its volume, if a constant density is present (13.19).
The result accordingly is a relative decrease of the volume of the earth and the corresponding mass being under the measurement place, as well as a relative decrease of the radial component of the field strength, but a corresponding relative increase of the tangential component of the field for 0.061% (13.22 with 13.18).
In the gallery the measurement wire however is spread out in the direction of the tangential component of the field lines, and that shortens the measurement wire as a result of the field dependency of the linear measures<ii> (13.23). From the above increase in field the calculational shortening of the rule for 40 cm results, which compared to the measurement result also should be rated as a confirmation of the theory of objectivity which was taken as a basis<ii>!

<i>: Example: K. Meyl: Potentialwirbel, Bd. 1, reference entry /5/
<ii>: for that see also part 1, chapter 6.6, equation 65 and chapter 6.10
<iii>: K. Meyl, Potentialwirbel Band 2 (1992), page 27, equation 20

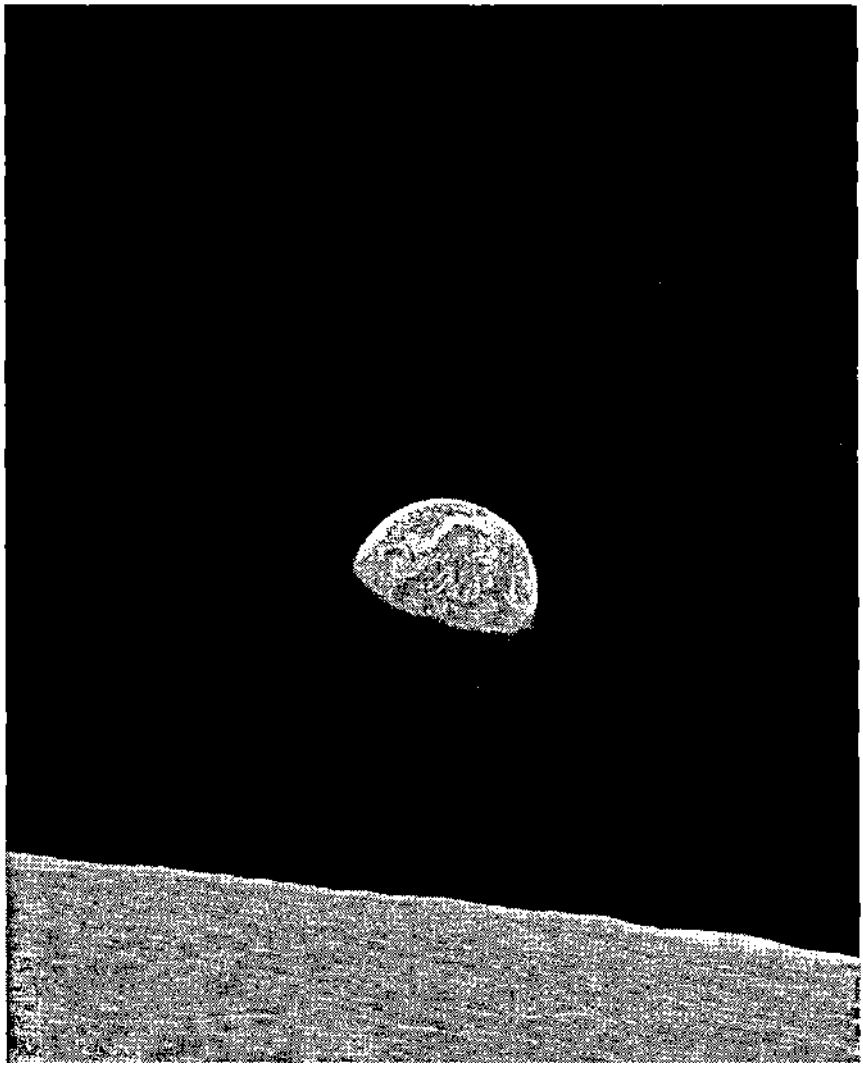


Fig. 13.5: Rise of the earth over the horizon of the moon""

<i>: Mitton, S. (Herausg.): Cambridge Enzyklopadie der Astronomie, Orbis Verlag (1989), note: No star is seen!

<ii>: see also the references in part 1, chapter 6.9

13.5 Experiences from space travel

The good correspondence of the calculated shortening of the measurement wire and the until now not understood measurement in the Tamarack mines shows both qualitatively, and quantitatively the correctness and useful applicability of the theory of objectivity of the field dependency of the linear measures. Our measurement laboratories normally are situated on the earth's surface and there everywhere are found approximately identical field relations. But if we leave the usual measurement environment and move the laboratory for instance in the sky, then we experience a complete mystery. Here however prevail the reversed conditions as in the mines experiment, in which in the inside of the earth. for an increase of the field strength, a length shortening was measured. In the sky the field strengths decrease and the linear measures correspondingly increase.

This experience astronaut Roosa made in the Apollo 14 mission. While he alone in his capsule orbited the moon, he depicted mission control, he could see the lunar module and observe his two colleagues at their work on the moon. Nobody wanted to believe the astronaut, since he was flying in a height of 180 km!

Commander Armstrong (Apollo 11) at the first landing on the moon indicated, the target crater Mackensen, 4.6 km in diameter measured from the earth, just has the size of a soccer field! Astronaut Scott (Apollo 15) called Mount Hardley, which is said to be 4.8 km high, a practice hill for skiing. Perhaps they somewhat have exaggerated, but a true core in the statements always is present!

Actually the gravitational field of our satellite is very much smaller than that of the earth. On the surface of the moon there is only one sixth of the gravitational pull of the earth. If we, to be able to compare, stick to the details of size, as they are measured by our laboratory on earth, then the astronauts on the way to the moon together with the lunar module and their rover had grown for a factor $\sqrt{6}$, then the first footprint is 2.5 times as large as on earth, then the astronauts were moving like giants in the scenery of a model of the railroad (eq. 13.23 and note[ii] at fig. 13.4).

On the moon there exists almost no atmosphere, for which reason the astronauts had imagined a wonderful view of the star-spangled sky, at least before they started. After the landing they were bitterly disappointed. The sky was black and not one single star could be seen! They have brought many photographs, but nowhere stars have been photographed, they apparently have moved outside the range of vision (fig. 13.5 and 13.6).

Many will still remember that the first pictures, which the space telescope Hubble supplied 1990, were completely blurred. The problem obviously was, that the mirrors had been adjusted on earth and not in space. Only after the optics had been given glasses in 1994, sharp pictures could be radioed to earth. Somehow the distance to the stars had changed. The telescope had become short-sighted, resp. the distance to the star-spangled sky appeared to be gotten larger. We already know why. If we remove us from the gravitational field of the earth, the field strength decreases and the observable distances increase! The highly sensitive telescope already sufficed the 5% deviation, with which should have been reckoned for the near earth orbit, to be fatal.

One should have familiarized the astronauts before with the laws of physics. Then this disappointment would have been spared to them, and in the case of the Hubble telescope the NASA and the european ESA could have saved a lot of money for the sake of the tax-paying population[ii].

Fig. 13.6 a: Illustrierte Wissenschaft Nr. 11 (1997) Page 62

1st example: landing on the moon
gravitational ...

$$\frac{\text{...pull of the earth}}{\text{...pull of the moon}} = \frac{g_E}{g_m} = \frac{M / R^2}{m_m / R_m^2} = \frac{M}{m_m} \cdot \frac{R_m^2}{R^2} = 6{,}0375 \quad (13.27)$$

in space everywhere on the surface of a sphere is valid: $A = 4\pi R^2$

eq. 13.20 (fig. 13.4<iii>): $m \sim \phi = A \cdot B = 4\pi R^2 \cdot \mu H \sim R^2 \cdot H$

as well as eq. 13.23 (fig. 13.4<ii>) for the field dependency: $H \sim 1/l^2$

and further:

$$6{,}0375 = \frac{g_E}{g_m} = \frac{H_E}{H_m} = \frac{l_m^2}{l_E^2} \quad (13.28)$$

resulting in the length dilatation (expansion) on the moon:

$$l_{m\,(Mond)} : l_{E\,(Erde)} = \sqrt{6{,}0375} = 2{,}457 \quad (13.29)$$

2nd example: communications satellite in a geostationary orbit (at h = 36000 km above the equator, R = 6378 km).

$$\frac{l_h}{l_E} = \sqrt{\frac{H_E}{H_h}} = \frac{R+h}{R} = 6{,}64 \quad (13.30)$$

Fig. 13.6 b: Examples of calculation for length dilatation<i>

<i>: If the theoretical value of 6.64 could be quantitatively confirmed by observations from off the earth with a telescope at a corresponding magnification, then with that would have been proved, that in the case of the spherical aberration it actually concerns the calculated influence of the field.

<ii>: U. Seiler-Spielmann: Das Marchen vom toten Mond, Zeiten Schrift 5/94,S.39

13.6 Spherical aberration

It is true that the problem of the changed length relations is known to the experts under the term of a "spherical aberration". But with that it is neither qualitatively nor quantitatively understood. Only the theory of objectivity soundly gives reasons for, why the astronaut Roosa has seen his colleagues almost 3 times as large, why weather satellites in a height of 1500 km are approx. 25% larger and why communications satellites in a 36000 km high geostationary orbit even increase to the 6.64 fold of their original size<i>. It also explains, why the neutral point between earth and moon, at which the attraction of masses of both celestial bodies mutually cancel, wasn't reached at the point where it had been expected by the moon rockets<ii>.

We, the inhabitants of the earth, are adapted completely to the conditions on the earth's surface. If we find our way well in the dimensions of space and time, as we observe them, then that must not be valid by all means for science, because that has made it its business to find out the secrets of nature.

If it wants to deserve the name science, then it on the one hand has to consider, that we, the organic materials, as well as all inorganic materials are assembled from the same atoms and molecules and with that are exposed to the same length relations. If changes in length between day and night (as a result of the gravitational field of the sun (see chap. 6.7), between summer and winter or as a result of changes in field occur, then we aren't able to register this at all. That even today the ,,foot" is used as a measure, for instance in the air traffic, shows only too clearly, how man raises itself to the measure of all things. Science asks for modesty!

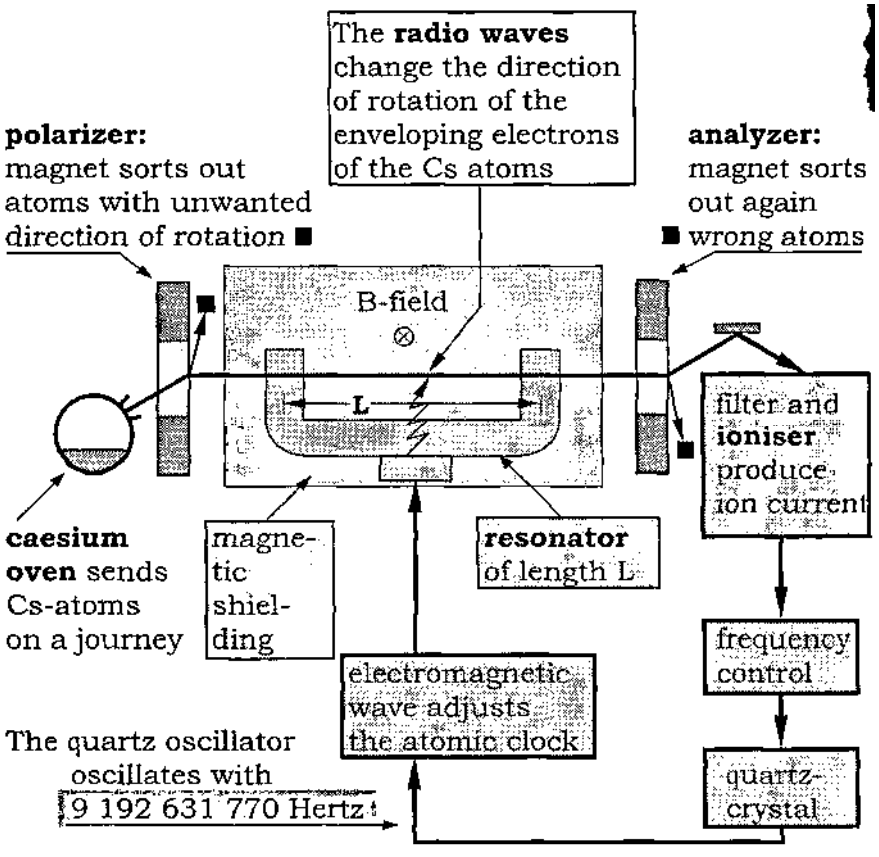
On the other hand it should be paid attention to the fact, that man eyes everything with speed of light with the optics of his eyes, and that speed by no means has to be constant. Solely the definition of the speed of light c as a linear measure per unit of time points to the direct proportionality between c and a length 1 (see chapter 6.3):

$$c \sim l \qquad (13.31)$$

If a rule has proven to be unusable for measuring a distance, then we'll experience the same disaster, if we measure optically, i.e. with the speed of light. Obviously both, the length 1 and the speed of light c depend in the same manner on the respective local field strength. On the one hand both measurement techniques lead to the same result, but on the other hand what can't be measured with one method, neither can be measured with the other.

To prove the constancy, it is normal to measure the speed of light optically. But since there exists a proportionality between measurement variable and measurement path (53), the unknown variable is being measured with itself. This measurement faulty by principle in all cases delivers a constant value. In contrast to the textbook opinion of today by no means a constancy of the speed of light can be assumed. In the case of the in a vacuum measurable 300,000 km/s it concerns a capital measurement error, at best a constant of measurement, but never ever a constant of nature!

With the postulate and the misinterpretation of a constancy of the speed of light as a universal constant of nature Einstein already let several generations of physicists run into the same dead end, in which they today are stuck altogether. It surely is no accident, that the big time of discoveries abrupt came to an end with Einstein.


The **radio waves** change the direction of rotation of the enveloping electrons of the Cs atoms
polarizer: magnet sorts out atoms with unwanted direction of rotation
analyzer: magnet sorts out again wrong atoms
B-field
L
filter and **ioniser** produce ion current
caesium oven sends Cs-atoms on a journey
magne-tic shiel-ding
resonator of length L
frequency control
electromagnetic wave adjusts the atomic clock
The quartz oscillator oscillates with 9 192 631 770 Hertz
quartz-crystal

Schematic representation concerning principle of functioning
L = length of resonator determining the exactness
The B-field is a weak magnetic field, which eliminates the influence of magnetic stray fields.
The arrangement in addition is situated in a vacuum tank.

Fig. 13.7: Set-up of a caesium atomic clock

13.7 Irony of the measuring technique

Let's record: The linear measure is determined and defined by a measurement of transmission time. As a reason is given, that with today's clock technology a higher precision and reproducibility can be obtained, as with a rule or original meter. The exactness of going of the atomic clocks again depends on the free flying path (L in fig. 13.7) of the atoms. For the caesium clocks of the Physikalisch Technischen Bundesanstalt in Braunschweig the resonator length amounts to several meters! The clock is used world-wide as a standard.

The irony thus lies in the fact, that a geometric length dictates the measurement of time and the measurement of time again determines the measurement of length - poor science!

How does one free oneself from a capital closed loop conclusion? Why and how do signal transmission times or clocks actually depend on the gravitation? Who once got stuck in a dead end, knows that he only can get out in the reverse gear.
A possible way goes back to the roots of classical physics and to the theory of objectivity in the 1st part of the book, which is free from the limits of a subjective and relativistic observer standpoint. That isn't a dead end and in addition explains, why all atomic clocks react sensitive to magnetic fields (magnetostriction) and what these fields have to do with gravity (see chap. 6.9)!

Today's clocks are so exact, that even differences between a clock stationed on a mountain and one at sea-level can be recorded. Even more clearly was the depending on gravitation determined at an atomic clock, which was shot in a rocket 10000 kilometres high into space. The result of the analysis without doubt was, that the clock in that case doesn't „tick" correctly anymore.
But what does theoretical physics say about it? It claims, here the ,,red shift" has been measured; it thus concerns a confirmation of the special theory of relativity. But since it concerns a clock experiment and not a light signal, it clearly contradicts this theory, which isn't able to describe any gravitational effect at all, as is well-known. For this case in the spheres of theoretical physics one helps oneself with the general theory of relativity, with which actually only would be proven, that the two theories from the legacy of Einstein completely incompatible contradict each other. We come to the following conclusion:

Whoever gives details about length or time, is obliged to also indicate the reference system.

He also has to inform where his laboratory is situated and with which devices he measures!

With the conclusion also the discussion would be opened. Throughout the last four chapters a main idea can be found. It should be worth, to again think about the brought forward arguments and to dare a comparison with text books.
In the text books there doesn't exist such a thing as an oscillating interaction. Here no answer is found to the question, why the solar system isn't hurled out of the galaxy as a result of the high velocity, why the inside of the earth is hot, how the geomagnetism is formed, why the continents drift and why the ocean floor nowhere is older than 200 million years, as samples from the ocean floor prove<i>. How would you answer these central questions?

<i>: Kendrick Frazier: Das Sonnensystem, Time-Life Bucher, Amsterdam (1991).

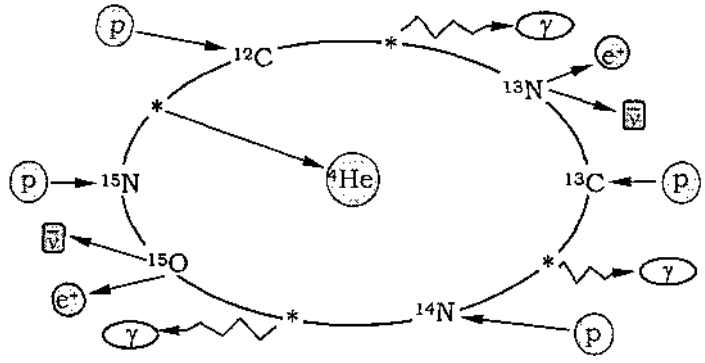


Fig. 13.8: The Bethe-Weizsacker cycle (concerning the sun's fire)
(meaning of: ^{12}C = carbon nucleus, ^{4}He = helium nucl., γ = gamma quant, ^{14}N = nitrogen nucleus, p = proton, e^+ = positron, ν = anti neutrino, ^{16}O = oxygen nucleus

Fig. 13.9: The top of the unfinished obelisk in Assuan<i>

<i>: Hermann Wild: Technologien von gestern, Chancen fur morgen, Jupiter-Verlag Bern (1996), ISBN 3-906571-13-0

13.8 Discussion of the cosmological insights

The numerous models which are offered, of a geodynamo, an iron core, of assumed zones of subduction and of plate tectonics may be helpful for the explanation of individual isolated phenomena. But they physically don't give a uniform picture and partly contradict each other.

Lord Kelvin had calculated a period of shining of 5000 years on the basis of a sun consisting of coal[<i>]. The german physicist Hermann von Helmholtz landed at 15 million years, in which case the sun yearly should shrink for 100 meters. He already assumed a temperature of 15 million degrees centigrade, as also the Bethe-Weizsacker cycle has as a prerequisite, which according to today's concept should describe the process of nuclear fusion taking place in the inside of the sun (fig. 13.8). The only thing is that this extreme temperature is completely incompatible with the high density in the core of the sun! There are more than good reasons to assume the opposite of the widespread textbook opinion and assume that the core of the sun is cooled by the collected neutrinos in the same manner as the inner core of the earth and that superconducting areas are formed, which powerful fields even cause the protuberances on the surface of the sun. Since in the sun no measurement is possible, with which a model could be verified or disproved, terrestrial arguments naturally suggest themselves. Here the pieces of evidence for the growth of the earth can be taken in the hand and photographed. We already have discussed some facts. But there are found a multitude of other ones, for instance from the domain of archaeology, for which text books of today until now as well provide no explanation.

Possibly the stones and monoliths weighing several tons, as they were used for prehistoric buildings, should be linked with the growth of the earth. If the earth was smaller at the time they were build, then they perhaps by no means were as heavy as today!
Then the stones for reason of the smaller density in addition were softer and with that easier to work on. Dr. Wild points to the building technical peculiarity, that the stones formed like cushions originally must have been soft. He proves with the photograph of the top of the unfinished obelisk in Assuan (fig. 13.9), that the traces of working stem from a spatula in a plastic mass.
Also the perfect fitting of the stones used for the building of the pyramids can only be explained in this way. In the joints not even a knife point can be inserted!

If even stones in the course of time increase in density and hardness, then it is easier for us to comprehend, how small rivers in past time could dig large deep valleys in the earth's crust, then we perhaps also understand, why very old bones today are petrified[<ii>]. It is obvious, that also bones in the course of time increase in density and hardness. Even if science should succeed in breeding living dinosaurs, then their chance to survive in spite of that would be equal to zero, because the dinos would collapse under their weight of their own of several tons. Their bones would be much too thin and brittle for their weight of today!

<i>: Kendrick Frazier: Das Sonnensystem, Time-Life Bucher, Amsterdam (1991)
<ii>: The indication to petrified bones stems from a participant of the seminar.

25-07-1996:	Assistant head of government department Acceptance of the common standpoint.
11-12-1996:	European parliament Resolution of the guideline.
	commission Statement concerning proposals of change of the european parliament.
19-12-1996:	Assistant head of government department Resolution of the guideline.
19-02-1997:	Coming into effect of the guideline Publication in the official paper of the EC.
19-02-1999:	Period of translation of two years
	Reduction of the threshold values for current consumers:
19-02-1997:	to 40 million kWh (opening of the market 23%)
19-02-2000:	to 20 million kWh (opening of the market 28%)
19-02-2003:	to 9 million kWh (opening of the market 33%)
until 2006:	,,Anti imbalance clause" A nine years period of transition to preserve equal opportunities in the competition. Report of the commission.
19-02-2006:	Further stage of the liberalization European commission tests by means of the made experiences, if the current market should be opened further.

Fig. 14.1: ____ Timetable of the EC single market guideline electricity<i>

<i>: Grawe, S. Thiele: Vorbereitung der Stromversorger auf den Wettbewerbsmarkt, ATW Atomwirtschaft-Atomtechnik 43. Jg. 1998, Heft 1, S. 10 - 13

14. The way towards free energy

Can energy actually be produced? No energy supply enterprise is capable to do that. Fact is, that energy only is converted and not produced. For that the available resources on earth are tapped and brought into a utilizable form of energy. As different the conversion processes may be, finally always heat is formed. We thus gradually burn the globe, on which we live. How long can something like that go right?

Science gives all-clear: „stock of energy is sufficient for the next 100 years. Newest calculations disprove the fear of a scarcity of energy on earth. There exist large stocks of coal and oil"<i>.

But what are 100 years compared to the age of the earth? How will our descendants judge our thinking and acting? They will condemn it and curse us, that much is clear already today.

We have an obligation to preserve the environment, and we only will be able to fulfil it, if we look to nature, how it covers its need of energy, if we finally understand and meaningfully copy nature.

We still are miles away of the goal.

14.1 The liberalization of the energy markets

It is important in the interest of a member of the executive that the stock of energy doesn't draw to an end, as long as he carries the responsibility for the enterprise of the economy of energy. The interest in the environment and the environmentalists for obvious reasons is less distinct. The problems are more of a commercial kind. Concerning that an actual example is given.

A special kind of problem is the meanwhile Europe wide valid decree of the EU concerning the liberalization of the energy markets (fig. 14.1). The list of the consequences starts with the fact, that the concluded licence contracts for power supply between energy supply enterprises and the communities, which are valid till 1997, are only wastepaper. Every customer of electricity as of now can conclude an individual contract with every "producer of electricity".

So an environmentally aware Black Forest person decides to obtain his power from a wind power station, which is situated in Denmark. That truly sounds very liberal. But how should that function, if there is no wind at all in Denmark for a week, or the connection is interrupted by a flash of lightning? The windmill further delivers power and the runner writes its bill truly believing, its power has arrived. The consumer then reads the bill at candlelight and puts with understandable anger his claim for compensation together. Pointing to the fact that such difficulties can be solved by book-keeping, the consumer again is calmed down; but that the not by contract obtained power will cost him dear, is another story.

<i>: Illustrierte Wissenschaft Nr. 6, Juni 1996, page 48-51.

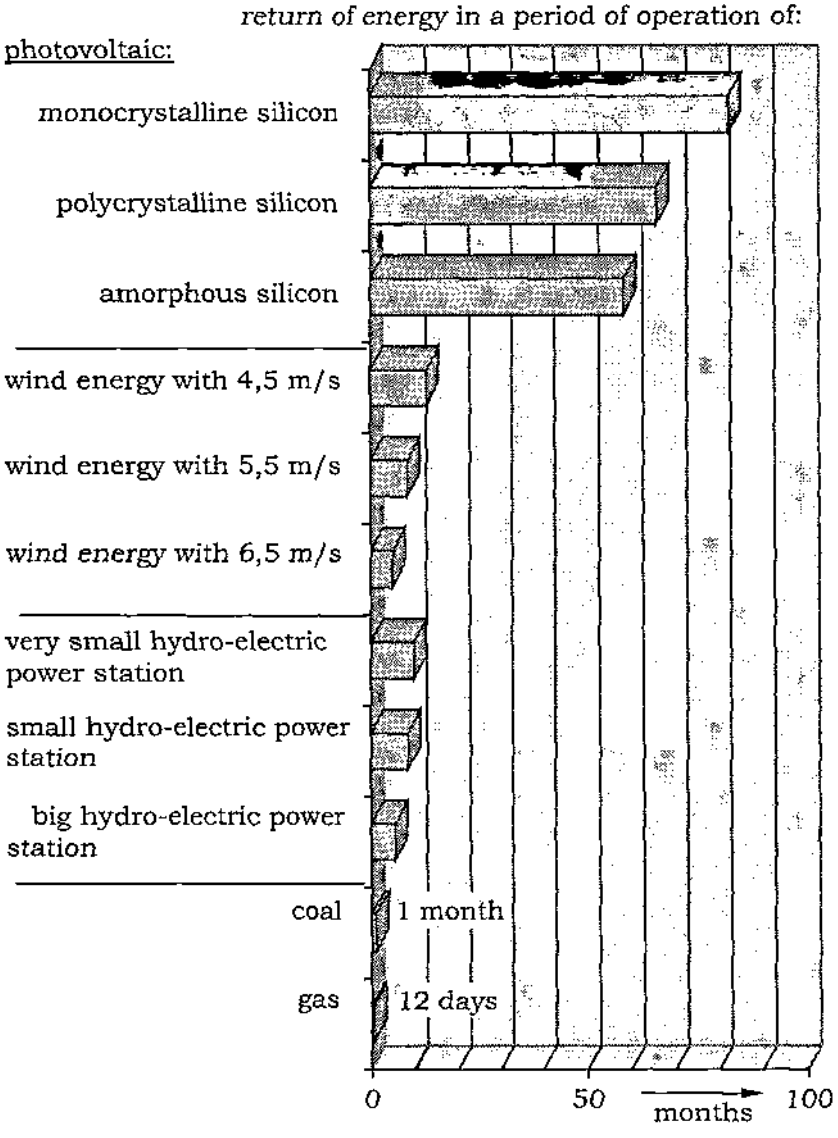


Fig. 14.2: Average time of paying for itself for the spent energy (return of energy)

14.2 The consequences of the liberalization

With the EU decree the monopoly only has shifted towards the runners of the distribution nets, after all only one net is present. Competition however would require at least two nets, thus a doubling of all house connections and all high-tension pylons, but that fortunately is unrealistic.

To prevent fleecing of the consumers by means of the net monopoly, politics introduces in the place of the free market economy dirigisme and plan economy with the well-known concomitants: no-one will look after the existing nets, no-one feels responsible anymore, because after all they have become public good by decree. One thus lets the pylons rot slowly and repairs only in emergencies. This possible development really can't have been the good intention of the EU.

In the next few years we however will be able to observe for the producers of energy exactly the development, which the EU-commissioners have imagined: Total competition contest, price war and a struggle for power to survive economically. A chance only has the nuclear power station, which gets rid of its refuse cheaper and if need be even illegally or which lives of indirect state subsidies, or the brown coal power station, which increases its efficiency at night, when no-one watches, by switching off the expensive filters.

The first power stations, which are selected out by the liberalized energy market, are the hydro-electric power stations which stand closest to nature. They simply are too small and too intensive of personnel, to be able to survive.

Gas turbine power stations, which deliver the power for half the price, than are ranking first. Then there is no place for regenerative systems anymore.

Solar energy, how many roofs a supporting program may have, stays a toy supported by the state. For a photovoltaic installation the ,,Return of Invest" still lies at more than 80 years, whereas is reckoned with a theoretical life of 20 years. In practical use on the other hand photovoltaic installations occasionally already have failed after seven years, after the photocells had gone blind. In this case not even can be talked of an ecologic energy, because the return of energy lies still above that. The supposed Idealist who spoils his roof with photovoltaic to reassure his ecologic conscience, would have spared the environment more, if he had covered his need of power from the socket, because already the production of the photovoltaic installation gobbles up more energy than can be produced with it. With regard to the environmental compatibility the ecologic balance sheet of a power station is attached a central importance (fig. 14.2).

With the law of feeding in power the state intervenes dirigiste, supposedly to protest the consumers. With this law the state orders, that not it, but the energy supply enterprises have to take the subsidizing of the regenerative energy, that they have to take over the power delivered at the inappropriate time in exactly so less suitable amounts at a price, which exceeds the market value by a factor of two and for falling prices of power even by a factor of four. With the law the politicians very fast and without agreement of the effected enterprises have shifted the ,,black Peter" further to these, which will get problems to preserve their competitiveness in the international comparison with the subsidy duty. It can't have been the intention of the EU-commissioners, that on a national level the price of power increases to finance some energy technical playground.

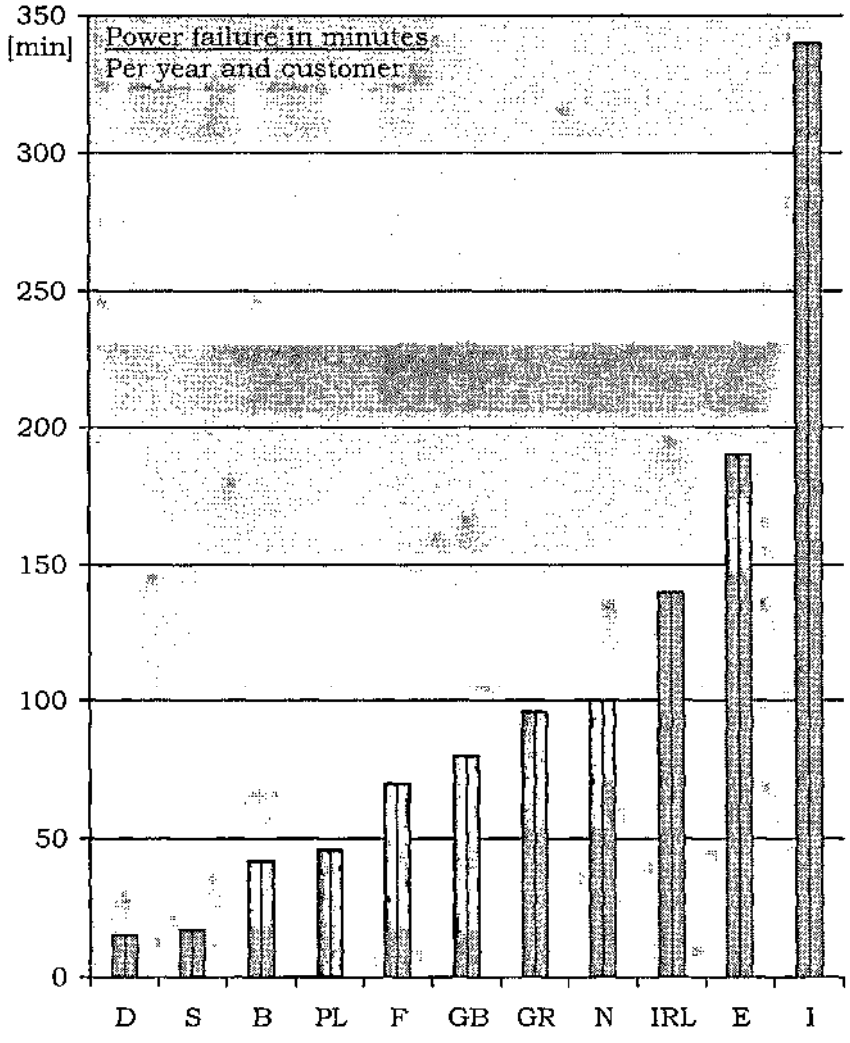


Fig. 14.3: Power interruption and not being at disposal

<i>: ETG, Energietechnische Gesellschaft im VDE: Qualitat der Stromversorgung, Dialog Nr. 1, Jan./Feb. 1998, S. 21

14.3 The chances of the wind energy

Meanwhile, as a result of the law of feeding in power, no longer the politicians but the energy suppliers are the ones, who around the North Sea look out of the window every day with the worry, some wind could blow and the mills could turn, because every kilowatt hour of a windmill must be subsidized strongly. Every windless day however reduces the power bill, with that helps the consumer and raises the chances of competition of our economy.
If it should be neglected, to tip over the law of feeding in power in due time with help of the EU, then the consumers will get their power in future abroad, then at the Preussen Elektra, damaged most by wind energy, as the first the lights will go out, then economic power and prosperity in Germany in future are dictated from abroad.
But if the law is dropped, then with that the duty to subsidize the regenerative energy carriers drops back to the state. Now all tax payers may foot the bill, even those, who don't use any power at all. The well-known Justice of subsidy" comes into effect.

Without support by the state only few types of power stations will be left behind. In addition are overcapacities being reduced, because they only cost money. But both is at the expense of the reliability of the delivering of energy and of the safety of the consumer. We owe the high stability of our network of today the large number of most different providers of power, which cover the basic load up to the peak load according to their suitability (fig. 14.3). But let us not talk of the golden past. The network after all isn't able to store power. From that follows, that without redundancy and without free power station capacities which can be activated at any time a short overload is sufficient, to let the network collapse.
Once the EU guideline concerning the liberalization of the energy markets is in effect, when persons selling power wend their way from front door to front door, to convince the housewives to obtain the power from them and not from other hawkers, when the power stations only live of stock and the depreciated overhead power lines only are entered in the hooks with the scrap value, then we should be dressed warmly and always have ready sufficient candles <i>.

14.4 The chances of being self-sufficient concerning energy

The only way out is the decentralized energy supply, the getting out of the large energy union and the way towards being self-sufficient. The argument sounds convincing in view of missing alternatives. But now it no longer is possible to plug the plug in the socket and then switch on whenever it pleases us. First it has to be calculated, if the windmill or the installation for solar energy supplies sufficient power or if a cold meal should be made. In contrast to today's consumer habits the runners of such installations will have to adapt their need of energy to the prevailing weather conditions.

<i>: A baby-Boom, like after the big power failure in New York, would be the smaller evil. The inhabitants and shopkeepers in the New Zealand metropolis Auckland will long and frightened remember the power failure in february 1998, which lasted weeks and was a result of not carried out maintenance works of high-tension pylons.

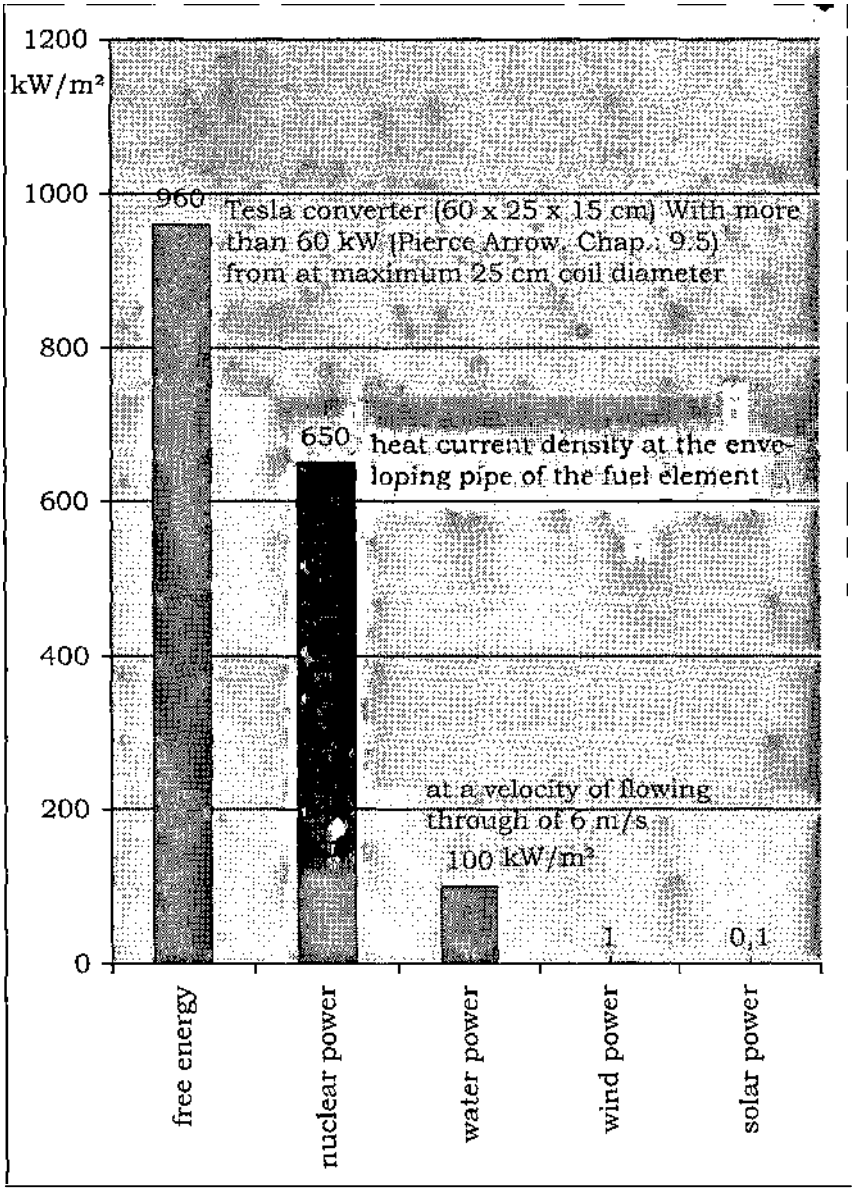


Fig. 14.4: At maximum obtainable power density of different carriers of energy

<i>: ETZ, Heft 19/1995, S. 40

Block heating power stations, propagated as stand-alone solution for people being self-sufficient, deliver power and heat at the same time. But if I don't need any heat on a hot summer day, then also no power is available or I uselessly heat into the open. For that one may leave all electric consumers switched on in winter, even if they aren't used at all, only to get the hut warm. Does a stand-alone solution look like that?

The situation truly is demotivating. Even the energy suppliers meanwhile may have realized that the energy politic way is a dead end. But for real alternatives in energy technology the pressure by suffering still doesn't seem to be big enough.
The intention to learn of nature is present in principle. The solar fire one wants to kindle on earth in a fusion oven, but the oven does not as it should.
Obviously the sun functions completely different, as physics imagines today (see fig. 13.8).
Before copying stands understanding, and in there seems to be a hitch!

14.5 The space energy technology of nature

Also nature needs energy, even very much. But it hasn't got any connecting pieces for tanking and no oven lid to fill in the fuel, it doesn't know our ecologically harmful combustion technology and environment destroying explosion technology at all. Nature rather works with the opposite, with implosion and fusion.
The sun, we have derived, materializes the matter which it needs for growing and shining from the neutrino field. The earth and other planets imitate the sun.
The concept is simple and convincing. The source of energy lies in the air and mustn't be dragged about in tanks. Collected and materialized is just as much, as is needed at the moment. In that way the resource energy is spared. In addition there can be done without any sort of storing. In addition it can show a substantially higher power density, than all today known and used energy carriers (fig. 14.4).
Such a source of energy solves all described energy problems at once. Nature wouldn't be as we know it, if it wouldn't have this ideal energy, also called „free energy". The balance sheet of energy alone brings it to light, because as a rule it doesn't work out for biological systems. Often more energy is released than is taken up by the food.
In that case some migratory birds materially seen should have completely used themselves up before reaching their destination, if the energy necessary for the flight would be of purely material nature. From a concrete example the following is reported<i>: „migratory birds have - depending on kind - a maximum range velocity between 24 and 83 km/h and at their Atlantic flights no opportunity for an intermediate landing. They are thousands of kilometres on the way and hardly lose weight. For instance an Albatross with a body length of up to 1.20 meters and a wing span of up to 3.50 meters uses per kilometre only 8.5 grams of weight at a non-stop flight. How is that possible without additional supply of energy?"

<i>: K. E. Rathgeb: Wie man die freie Energie anzapft: Vogel machen es uns vor, Raum & Zeit 79/96, S. 74

Fig. 14.6: Freiherr von Reichenbach (76 years old)

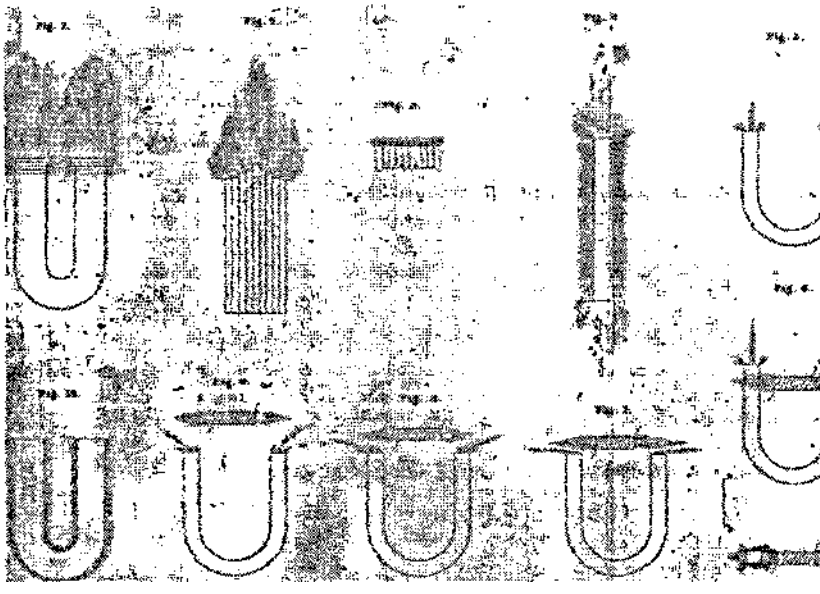


Fig. 14.7: Odic emanations of magnets according to pictures of
sensitives .<i>

<i>: H.-P. Thietz: Tatort Erde, VAP (1996), ISBN 3-922367-62-3, Seite 13 und 15

14.6 The gap in the energy balance of man

Even man appears to tap an additional source of energy, because for reason of scientific tests with recruits these over longer periods of time are able to physically release more than twice the amount of energy they take of calories with the food. Obviously living beings don't rely on one source of energy alone. Possibly the taking up of food predominantly serves the metabolism, and the energy aspect plays only a secondary role.
This interpretation at least would be obvious, since we scoff several times a day, sort the necessary and useful building-materials out and hand over the rest to the purifying plant and nature, where some bacteria and organisms search the sorted out again for useful things. "Food chain" we call this kind of building-material trade.
If the whole had anything to do with energy or with a „ combustion process without fire ", then no animal nor any human being could do without the taking up of food for longer periods of time. But Franciscus of Assisi could fast 90 days, as is handed down to us [ii]. There exist numerous examples, which reach into the time of today.

The mitochondria, the energy centres of each cell, by no means are capable of the "combustion process", which man ascribes to them. Here in all probability a taking up of space energy independent of food takes place.

A research scientist only has to look at nature with open eyes, what unfortunately happens rarer and rarer, because the laboratory scientist always is troubled, to keep the disturbing factor „nature " away from the experiments.

14.7 Carl Freiherr von Reichenbach

In this context no-one can go past two natural scientists: Carl Freiherr von Reichenbach (1780-1869) and Dr. Wilhelm Reich (1897-1957).

Reichenbach called the by him investigated life energy „ Od-energy " in the style of the Teutonic God Odin. He worked with test persons, who could perceive actually invisible light phenomena and worked out the special properties of this Od-energy field with the "sensitives", as he called them.

A quotation from his work shows however that the knowledge about the life energy must be a lot older[iii] than his own discoveries: „On paintings saints often are shown with a ring-like aureole around their head, something I before this would have dismissed as a pure figment of imagination. But it was shown that this glowing ring actually can be perceived by the sensitives as an Od-phenomenon and so the aureole obviously can be traced back to real impressions of particularly sensitive persons."

Reichenbach also found out that water has a big endeavour to take up this Od-energy or in the language of the present day, to absorb the field energy. This circumstance we find confirmed in technology, since water absorbs high-frequency waves, whereas an insulator or a vacuum lets them pass through. But without vortex physics it however remains entirely unclarified, why!

<ii>: H.-P. Thietz: Tatort Erde, VAP (1996), ISBN 3-922367-62-3, page 110
<iii>: H.-P. Thietz: Tatort Erde, VAP (1996), ISBN 3-922367-62-3, page 16

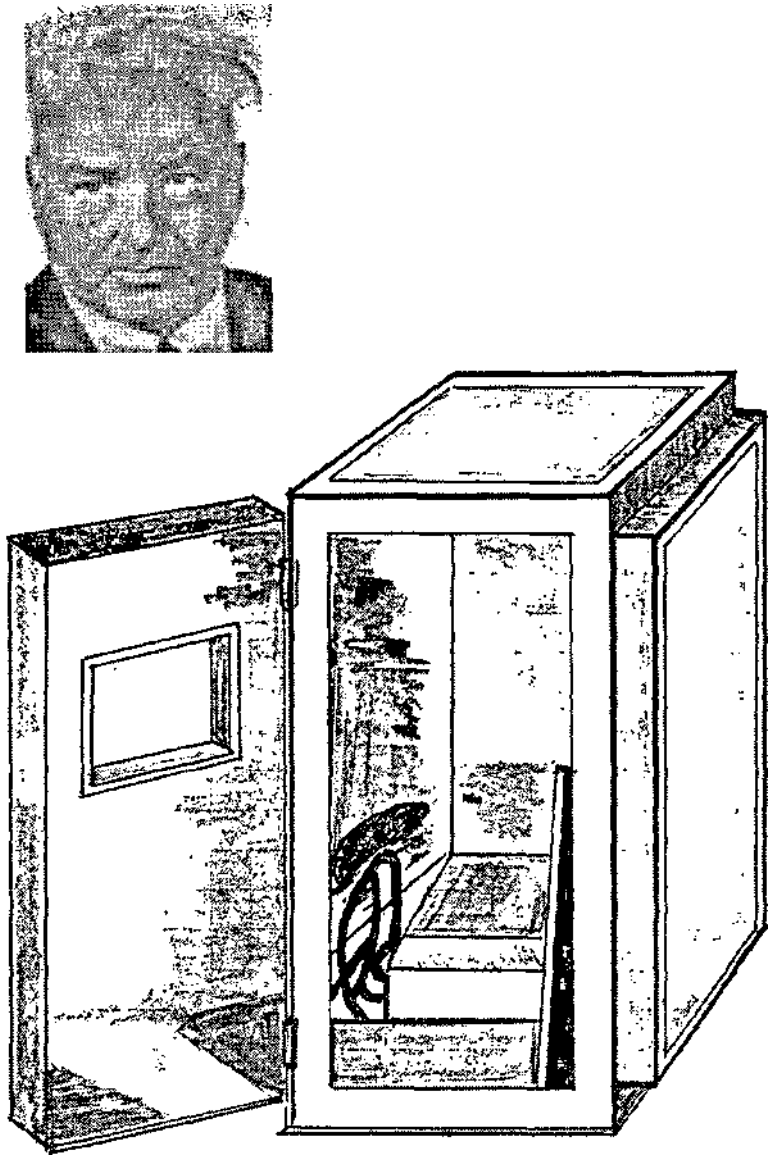


Fig. 14.8: Wilhelm Reich and the model of an Orgon accumulator
for applications of the whole body.[<i>]

<i>: taken from: H.-P. Thietz: Tatort Erde, VAP (1996), ISBN 3-922367-62-3, pages 38 and 89.

14.8 Cold fusion and Genesis

Chronologically the doctor and psychologist Wilhelm Reich followed in the footprints of Reichenbach. He merely altered the name for Od and spoke of Orgon. His speciality was the accumulation of Orgon radiation, I would say the focussing of neutrino radiation. Actually the properties like e.g. the missing possibility to shield Od, Orgon and the neutrinos are identical, so that we can proceed from assumption, that it also concerns the same physically.

We already talked about Wilhelm Reich (part 1, chapter 9.2). He could show that the measurable temperature in a closed box, constructed like an „Orgon accumulator", is increased in a mysterious manner without supply of energy from the outside. He even could prove, that this energy actually concerns the sought-for life energy, as he observed the creation of life in the laboratory under the microscope. For that he cooked muscle fibres, vegetables or other cells so long until the cell structure had been destroyed entirely. But from the educts entirely by itself new living beings, like protozoa or algae, were formed[i].

Reich at his microscope actually followed the transition of dead to living matter. What is of interest here, at first only is the energy technical aspect of this conversion. Later we will occupy us with the at the same time occurring information technical aspect.

Worth mentioning seems to me the experiment with the „silly" chickens, which have at their disposal astonishing abilities besides the laying of eggs[ii].

The test chickens were handed chicken food, from which to a large extent all calcium had been extracted. But the chickens showed themselves unimpressed and further laid keenly their eggs. The experimenters were surprised, where the chickens actually got the lime for the egg shells. How solves such a chicken the problem of raw materials? For that further materials were extracted from the food and look, at the removing of silicon the laying of eggs was over. The experiment actually only allows the conclusion, that the "stupid" chicken is capable of a cold fusion, that it itself „produces" the necessary calcium from silicon presumably by using carbon. Every alchemist here has to go pale with envy. But what says the research scientist of fusion to that, who actually should know, how fusion functions? After all he is paid for it by the tax payer! The chicken uses the fusion already today and the other living beings presumably also, but for that energy is needed and the balance sheet should work out!

The neutrino radiation therefore has to be factored into the balance sheet of energy. If the balance sheet then works out, it could be proven with that, that here neutrino energy is put to use. In addition the process of the conversion of neutrinos has to be investigated, which surely has something to do with the frequency and the wavelength of the radiation. After all a child has cells exactly as big as an adult. It only has less cells! So that an interaction can occur, the cell size has to fit in with the wavelength, which obviously is very small, presumably in the range of the radioactive radiation, with which circumstance the biological incompatibility with this electromagnetic wave would be explicable.

<i>: H.-P. Thietz: Tatort Erde, VAP (1996), ISBN 3-922367-62-3, S. 39

<ii>: Louis Kervran: Biological Transmutations, s.a. J. Heinzerling: Energie, S.278

1. Primary reaction
   (light reaction in the centre of reaction):

   ring-like vortices/neutrinos are being collected
   electrons are formed
   energy is produced
   e^- is attracted by the water dipole
   water molecule is being splitted (photolysis):

2. Secondary reaction (dark reaction):

   carbon dioxide is reduced with the hydrogen splitted off from the water to carbohydrate

Reaction equation of photosynthesis:

	6 mol CO_2	(carbon dioxide)
+	12 mol H_2O	(water)
+	675 Kcal	(vortex energy, light)
	1 mol $C_6H_{12}O_6$	(glucose)
+	6 mol O_2	(oxygen)
+	6 mol H_2O	(water)

Fig. 14.9: Concerning photosynthesis

14.9 Photosynthesis

The materialization of free electrons is a prerequisite to start the photosynthesis. The normally used explanation, the free electron necessary for the splitting of the water molecule was knocked out an atom by light, doesn't seem to be correct, after until now all attempts of a technical realization according to this model concept have failed. At the photosynthesis the plants obviously help themselves with the neutrino radiation, which according to an estimation of today with 66 billion particles per second and per square centimetre might be more than sufficient for a green earth.

If we put a seed in a water glass, then a plant grows from it and forms small leaves, which get bigger and bigger. A wonder of nature, we say. Where does it actually get its building-materials? From the water or from the air? Necessarily the plant obviously produces a part of the matter itself!

Experts think they have understood the process of photosynthesis: Take light and water and carbon dioxide and handicraft from that sugar and oxygen. But from where does the plant take the necessary energy for the rebuilding and the splitting of the water molecule, the photolyse? The taken up solar energy hardly is sufficient for that, especially since the plants only absorb about 1% of the photosynthetic utilizable sunlight incident on earth<i>. By means of reception molecules, which look like small antennas, pigments less than 30 nm in diameter, such is the level of knowledge, the sunlight is collected and led into a photochemical centre of reaction. Here the reaction should take place, provided that an electron set free by the light jumps into the middle of the centre of reaction. But exactly this favour the electron doesn't make the research scientists, who want to imitate the process. Copying nature still doesn't succeed.

The mistake presumably lies in the circumstance that the light doesn't set free any electron at all. The electron actually first of all is produced in the centre of reaction. By means of the antennas a neutrino vortex is collected, which at first occupies the entire space, to afterwards contract to an electron, which as a result automatically is centred in the centre of reaction.
In the process of materialization at the same time the necessary energy of the process is formed. The reaction equation after all also has to work out energetically, because the plants doing so get neither hot nor cold (fig. 14.9).
Because curiously the light reaction even can be observed in the dark<ii>, one could be inclined to in principle call into question the influence of light on the photosynthesis. But such an influence nevertheless seems to be present, after all does a plant react on the irradiation of light and changes its spectrum of absorption through its colour. But it for sure is another influence and not the one, which one attributes the green plants today! It would be important to finally understand the way of functioning. The plants and particularly the algae are the ones, which actually first have made possible life on this planet with the photosynthesis, the most original form of a production of matter and energy.

<i>: Luttge, U. u.a.: Botanik, VCH, Weinheim (1994) ISBN 3-527-30031-7, S. 136
<ii>: Luttge, U. u.a.: Botanik, VCH, Weinheim (1994) ISBN 3-527-30031-7, S. 126

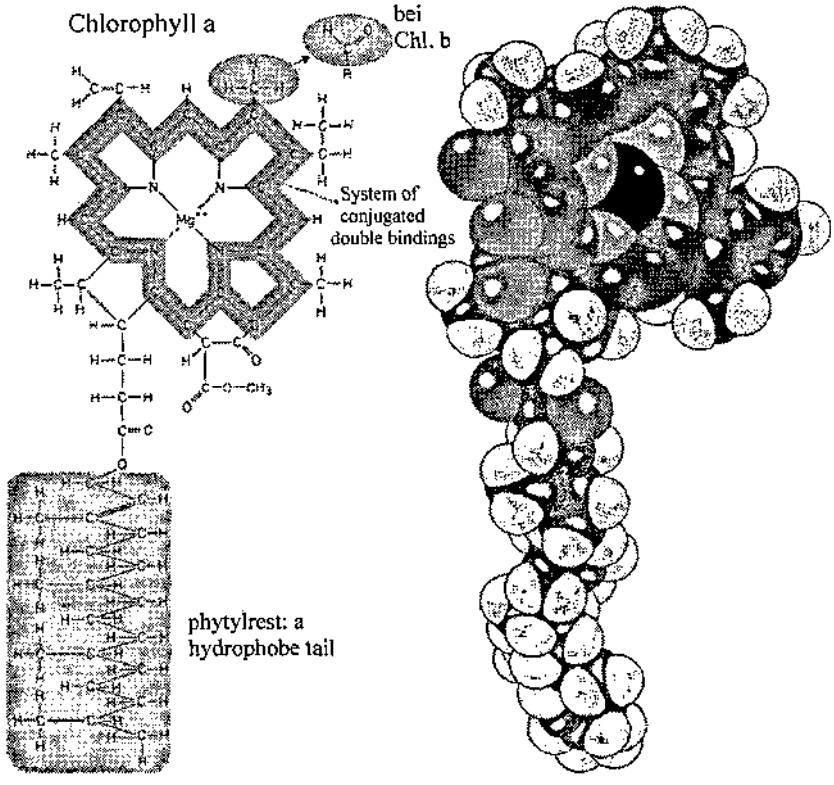


Fig. 14.10: Formula of structure and spatial model of the photosynthesis pigment chlorophyll.<i>

<i>: Luttge, U.et al.: Botanik, VCH, Weinheim (1994) ISBN 3-527-30031-7, p. 118

14.10 How nature materializes

The structure of the receiver antenna allows us a deeper insight into the manner, how free energy is tapped during the photosynthesis. For the dimensions determining the frequency of the photosynthesis pigments, as the antennas are called, we have to go down to the molecular structure. Fig. 14.10 shows the formula of structure and next to it also the spatial model of the pigment chlorophyll<i>.

Two points point at the function for free energy conversion. On the one hand is situated in the centre of the molecule a double positive ionised Mg atom, surrounded by four nitrogen atoms and a carbon ring consisting of 20 atoms, from which arises a polarization of the entire molecule. This in addition is oscillating because the electron cloud of the enveloping electrons, which hold the molecule together, perform swirl oscillations depending on the temperature. With that chlorophyll is able to go into resonance with oscillating neutrinos.
A role play the unipolar field configuration and the effect of resonance of the molecular oscillation of its own forming as a result of the polarization. A further role in addition seems to play the spatial structure.

The model of the „receiver antenna" chlorophyll taken out of a textbook<i> and shown in fig. 14.10, consists of a stalk and a spirally wound head, which resembles a Lituus or crook, which Etruscan and Roman Augurs have taken in the hands for land surveying, a precursor of the crosier (see fig. 16.10). This again has the form of a Tesla coil and that, as already derived, is able to withdraw rotational energy from the collected neutrinos (chapter 9.8). Doing so free electrons are materialized, and these then start the process of photosynthesis. An explanation concerning the way of functioning of the antenna pigments here for the first time is getting available.
By the way also the mitochondria, which form the energy centres in every cell, have as well the form of a Tesla coil. Whoever wants to understand the energy economy of a cell or the photosynthesis first should occupy himself with the Tesla coil (chapter 9.8).

The open question, how land surveying should be possible with a Tesla coil, we at first still have to shelve, because in this chapter it concerns the way towards free energy and the chance to learn of nature. Examples to be looked at are on the one hand the core of fusion in the inside of the earth and on the other hand the humus layer on the surface of the earth, which has been materialized in the course of time with the help of photo-synthesis.

The goal seems to be worth striving for. If we in the first place have learned to produce energy exactly like nature, then we'll further try to produce matter purposeful, with which ageold alchemist dreams could be fulfilled. We wouldn't need to scrape and to search in some mines any longer. We would materialize the products without refuse, naturally and just for the environment, direct in the final form. I admit that at present it sounds pretty futuristic.

With another example, the lightning and particularly the ball-lightning, the collection concerning the use of free energy in nature shall be completed.

---

i>: U. Luttge, M. Kluge, G. Bauer: Botanik, 2. Aufl.- Weinheim, VCH (1994) ISBN 3-527-30031-7, S. 118

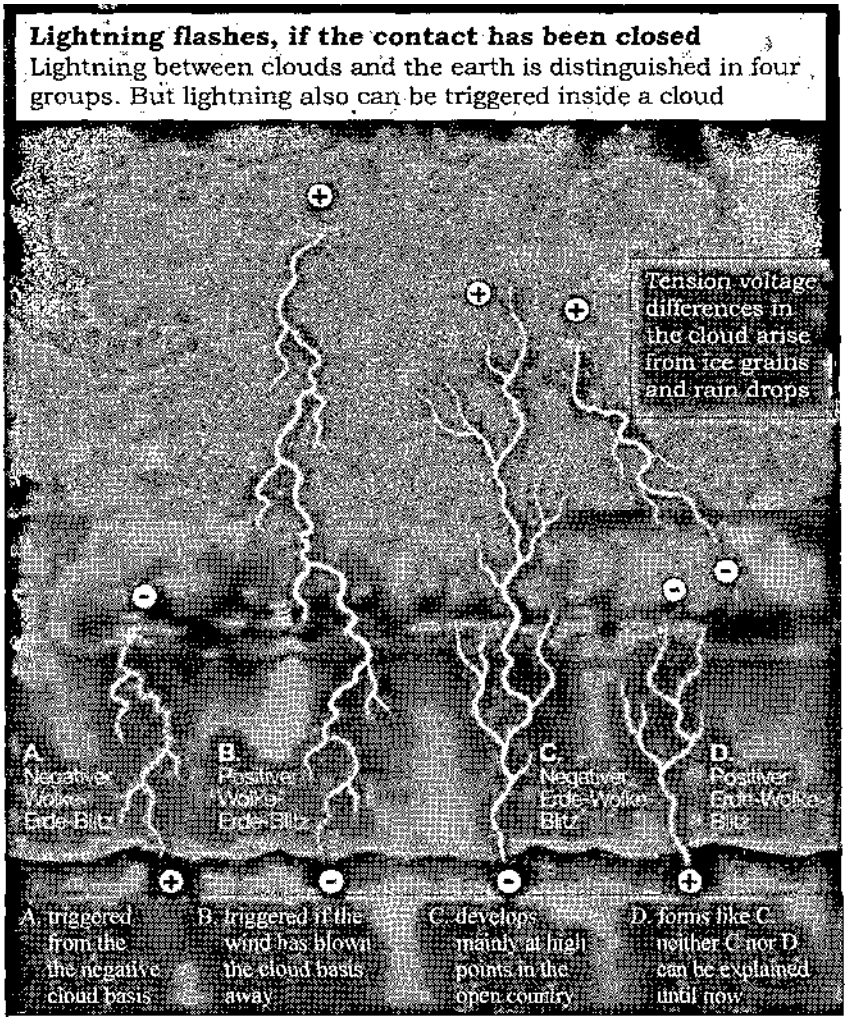

Lightning flashes, if the contact has been closed
Lightning between clouds and the earth is distinguished in four groups. But lightning also can be triggered inside a cloud
Tension voltage differences in the cloud arise from ice grains and rain drops
A Negativer Wolke-Erde-Blitz
B Positiver Wolke-Erde-Blitz
C Negativer Erde-Wolke-Blitz
D Positiver Erde-Wolke-Blitz
A triggered from the the negative cloud basis
B triggered if the wind has blown the cloud basis away
C develops mainly at high points in the open country
D forms like C neither C nor D can be explained until now

Fig. 14.11: Concerning lightning.[<i>]

<i>: taken out of: Illustrierte Wissenschaft Nr. 8, August 1995, Das unverstandene Phanomen der Blitze, S. 13

14.11 Lightning

Lightning is a spectacle of nature just as imposing as unsolved. It concerns an electric process of discharge, in which to the amazement of all experts arrive for several powers of ten more charge carriers at the surface of the earth, than before were contained in the cloud! Furthermore unsolved is, why lightning glows. Let us start with the open question for the difference of potential necessary so that the air is ionised and a lightning channel is formed.

If at first the electric tension voltage of 200,000 volts between the surface of the earth and a height of 10 kilometres is available, which according to our calculations results from the rotation of the earth and the magnetism of the earth (fig. 11.8). Another source of tension voltage is not known. By air movement and supposed processes inside a cloud locally an additional accumulation of charge carriers may occur, so that in the case of a thunderstorm the by Tesla assumed, twice as big value doesn't seem unrealistic<i>.
On the other hand a tension voltage between 4,000 and 10,000 volts is necessary so that a blow can occur for an air gap of one centimetre depending on the atmospheric humidity<ii>. Linearly projected the thunderstorm cloud theoretically should hover just one meter above the earth if there is lightning.
Here somehow a huge gap gapes between theory and practice!

At the latest at the spikes, the mysterious lightning, which strike out of a thunderstorm cloud upwards in the direction of the ionosphere and the still more mysterious ball-lightning it has to get clear, that the actual source of tension voltage of a lightning by no means is known. Without knowledge about the cause we'll never understand lightning.

The potential vortex theory offers an useful approach, according to which the necessary difference of potential is formed from a formation of vortices<iii>. The vortex again, as damping term in the wave equation, occurs as a result of intense sun irradiation. That explains why lightning always strike from the part of a cloud, which is the darkest, where the most sunlight is absorbed and the damping is the largest.

The possible formation of ice in a lightning channel is a further confirmation for the correctness of the vortex explanation. After all it has been derived that contracting potential vortices withdraw heat in principle (fig. 12.8).

But now we also want to know from this efficient theory, why photons and electrons are formed during the lightning and where they come from. Here obviously energy is formed by means of materializing of vortex particles.

<i>: R. L. Clark: Tesla Scalar Wave Systems, The Earth as a Capacitor, The Fantastic Inventions of Nikola Tesla, ISBN 0-932813-19-4, S. 265

<ii>: Karl Kupfmuller: Einfuhrung in die theoretische Elektrotechnik, Springer-Verlag Berlin, 12. Auflage 1988, ISBN 3-540-18403-1, S. 221

<iii>: K. Meyl: Potential vortices, Part 1: Discussion contributions to the natural scientific interpretation and concerning the physical-technical usage, basing on a mathematical calculation of newly discovered hydrotic vortices, (only in german) INDEL GmbH, Verlagsabteilung, Villingen-Schwenningen 1990.

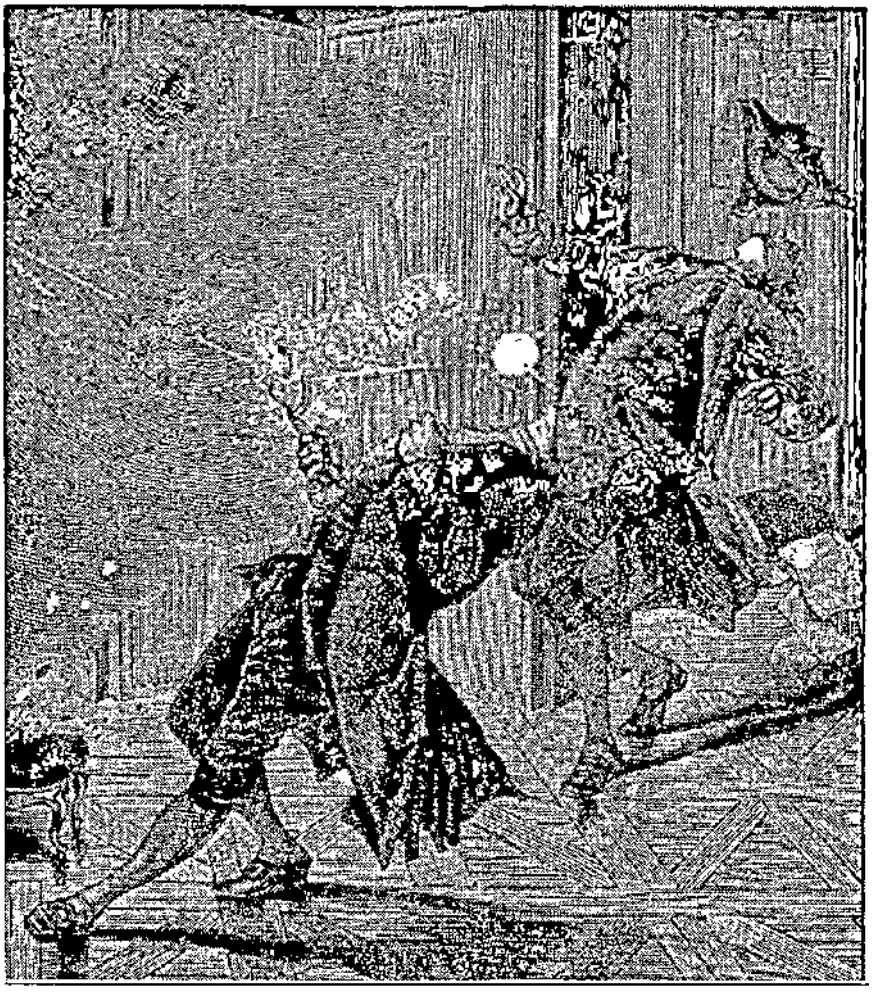


Fig. 14.12: Contemporary representation, how 1753 lightning
research scientist Prof. Richmann is struck deadly by ball-lightning in his laboratory.<i>

<i>: Illustrierte Wissenschaft Nr. 8, August 1995: Das unverstandene Phanomen der Blitze, page 13

I proceed from the assumption that lightning collects and converts neutrinos. The process corresponds to the one at the sun, but on a smaller scale and only for a very short time. The lightning channel is polarized by the charge carriers. Change of temperature and field lead to a spatial oscillation, which by the way also functions as a source of sound, as anyone can hear. Taken both together lightning, seen from the outside, becomes an unipolar resonator, which is capable to attract neutrinos and to go into resonance with them. Now the predominant part is converted into electrons, because also the air molecules and air ions in the lightning channel belong to the world of matter. But it can't be avoided that a small part of antiparticles is formed, which then annihilate with particles of matter under emission of radiation. Doing so photons are emitted and lightning glows, as anyone can see!

14.12 Ball-lightning

If in the case of lightning there still exist excuses, the difference of potential preferably is traced back to neither understandable nor measurable processes inside a cloud, then at the latest in the case of ball-lightning most experts are at their wits end. Only for very simple natures explanations circulate in the direction that here for instance the organic remnants of a bird struck by lightning are burnt off.

Actually ball-lightning is observed very seldom. It is a ball flashing with reddish till blue-white colour. Its diameter lies between 10 and 50 centimetres. The glowing phenomenon can last several seconds to minutes. Doing so ball-lightning rolls over a street, temporary floats in the air, goes apparently unhindered through every wall and disappears from time to time without a trace or discharges with loud moise and formation of sparks. Some stink of poisonous gases and some also cause noise.

Famous has gotten the ball-lightning, which 1753 of all people should have struck the lightning research scientist Professor Georg Wilhelm Richmann in St. Petersburg. In his laboratory during a thunderstorm a ball of fire as big as a fist should have jumped from a iron tube to his head and should have hunted him down, so eye witnesses have reported (fig. 14.12).

Since ball-lightning has a closed structure, it has to drag about its source of energy with it. If this however consists of organic or other matter, the ball wouldn't be able to float, after all the brightness of a spherical vortex and with that the need of energy is enormous! We have to proceed from the assumption that just ball-lightning covers its need of energy from free energy and serves itself from the neutrino field.

The spherical form is a consequence of the structure shaping property of the potential vortex<ii>. Scientists are increasingly interested in this not understood phenomenon. In their experiments they try to artificially produce ball-lightning with more or less great success in the laboratory. By means of the experiment they then want to learn to understand, what the textbooks don't give away.

If we want to learn of nature something about free energy, lightning in the laboratory offers us in the form of a blow or of a spark gap relatively good possibilities. It surely is no coincidence that the father of free energy, Nikola Tesla, in his experiments almost all the time has worked with spark gaps!

<ii>: for that see in the 1st part the chapters 4.8 till 4.10

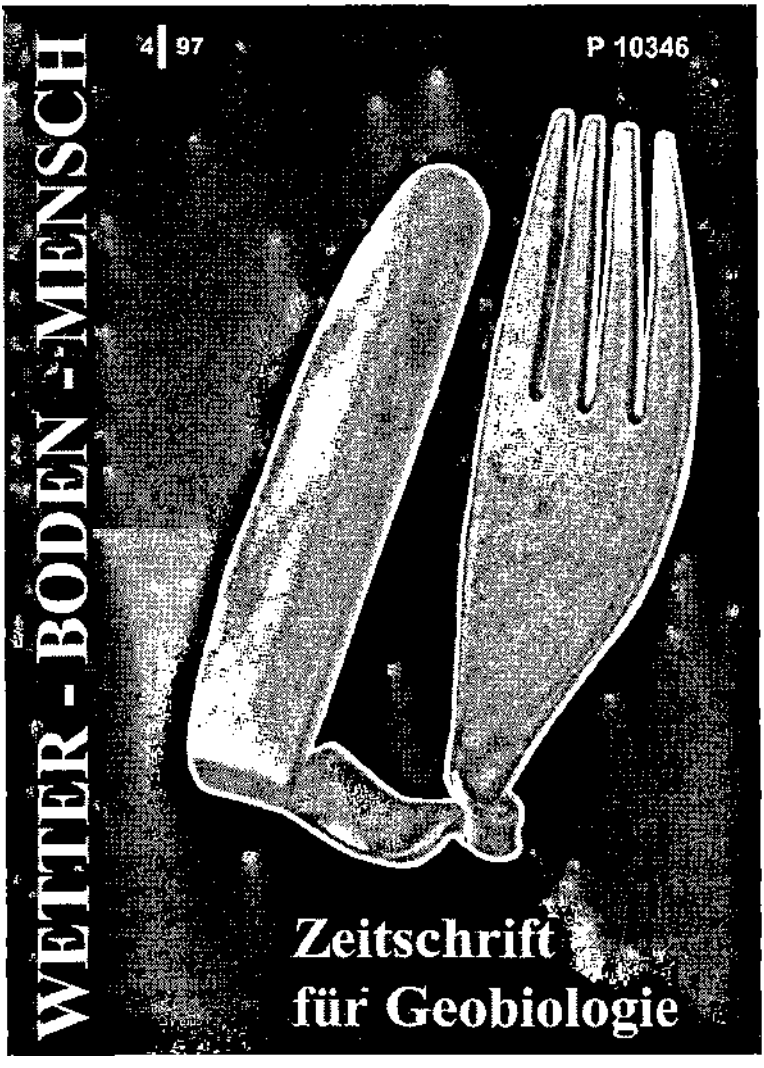


Fig. 14.13: Fork bent by ,,pure manual work".<i>

<i>: Whoever has to eat with bent flatware in the Hotel Adler in Waldkatzenbach (Odenwald, Germany), mustn't believe that the food didn't taste well to some rude fellow here. It is the host himself, who in a sociable round shows his guests from time to time that he not only can cook well. I could personally convince myself from the fact that Robert Hartmann doesn't use any aids. The picture shows the title page of the magazine ,,Wetter Boden Mensch" 4/97. A comment concerning this on page 3: Robert's 50^{ieth} birthday.

14.13 Discussion concerning the neutrino conversion

In nature two different principles for the use of the neutrino radiation can be observed. In one case of use a glowing phenomenon occurs, in the other cases not.

The glowing lightning should be assigned to the first case. Here not only the neutrinos crossing the lightning channel are used, but also neutrinos from the environment oscillating in resonance are collected. Around the lightning channel a kind of reaction radius is formed, inside of which all synchronously oscillating neutrinos are attracted under the resonant interaction. During the discharge process the radius can increase like an avalanche, to collapse again with the transition into the stationary discharge current. A corresponding technical concept, which is discussed in the next chapter (15.5), is very efficient, but almost uncontrollable. A characteristic is the formation of antiparticles, of positrons, in the course of the materialization, which then annihilate under emission of radiation and cause a shining. Also spark gaps and fluorescent lamps possibly help themselves from the neutrino field, as still has to be to worked out.

In the second case nature works without any avalanche effect and without any glowing phenomenon. To this counts for instance the photosynthesis or the mode of operation of the mitochondria, the energy centres of a cell. All cells, whether vegetable, animal or human, only use the neutrinos which just that moment pass by them and only in those amounts, as they just are needed. They thus handle their energy very caring. Without exception electrons are materialized and no positrons.
If nevertheless unwantedly an avalanche effect occurs, something which happens fortunately only very seldom, then a self-inflammation and self-burning occurs, then it should happen, that a person burns off himself<ii>. This risk also is known of hay.

There also exist rare talented persons, who can control and regulate the process of materialization by concentration. These people can bend spoons or other metallic objects<i>. For that they concentrate themselves some time and send the materialized charge carriers into the object, which they hold in their hands. Since the metal lattice solely is kept together by the enveloping electrons of the individual atoms, the additional electrons make the metal structure sodden. Now for a short moment the metal can be bent and distorted at will. Doing so neither heat is produced nor is the colour changed. The result of the process can be produced neither by cold working with raw force nor under a flue. Also here nature shows us a technology for an ecologically compatible metal processing (fig. 14.13).

The way from the conventional over the regenerative towards free energy is predrawn. It only has to be gone! After the existence of the neutrino radiation goes as proven and 1998 for the first time concrete amounts have been determined measuring technical and published by a Japanese team of research scientists, with that also the question for an energy technical use of the particle radiation has been answered clearly. Now only the question of the mechanics is open. The Japanese research scientists by the way have found out that at night only half as much solar neutrinos can be detected than at daytime. The other half according to that is absorbed in the inside of the earth. This in the meantime published measurement result in brilliant manner confirms the working hypothesis of a growing globe (chapter 11).

<ii>: Zu Asche pulverisiert, Illustrierte Wissenschaft 6/ 1997, S. 61 acc. to an examination of the American SCI-COP in 1984.

cause / field lines	interaction	F = force effect *mediation:*	see chapter: effect / *application*
1. open **H**-field lines	magnetic (static)	F_{M0} = magnetic force (permanent magnet)	chapter 15.4 *E.-engine, solenoid*
2. open **H**-field lines	resonant (oscillating)	F_{MS} = magnetic force (AC-magnet)	15.4 + 15.5 - 15.7 lightning, *railgun*
3. open **E**-field lines	electric (static)	F_{E0} = Coulomb force *by charge carriers*	15.9 + 15.10 atomic bond, *Testatika*
4. open **E**-field lines	resonant (oscillating)	F_{ES} = Coulomb force *by neutrinos*	chapter 16 + 17 weak interact. galaxy bond *Tesla converter*
5. closed **H**-field lines	gravitation (static)	F_{MG} = gravity *by particles with mass*	chapter 6.9 + 7 elementary particle mass
6. closed **H**-field lines	levitation (dynamic)	F_{ML} = reduced gravity	chapter 18.3 gravit. waves *Casimir effect*
7. closed **E**-field lines	gravitation (static)	F_{EG} (force hardly detectable)	chapter 18.7 *superconducting ring*
8. closed **E**-field lines	levitation (dynamic)	F_{EL} (no longer detectable)	18.5 + 18.6 *Keely-/Searl-flying devices*

electromagnetic and resonant interaction		gravitation and levitation
$F_{M0} = 1{,}4 \cdot F_{MS} > F_{E0} = 1{,}4 \cdot F_{ES}$	$\gg$	$F_{MG} = 1{,}4 \cdot F_{ML} > F_{EG} = 1{,}4 \cdot F_{EL}$
for reason of open field lines		resp. closed field lines

Table 15.1: The force effect of interactions, ordered according to size, with examples

15. Principle of functioning of space energy

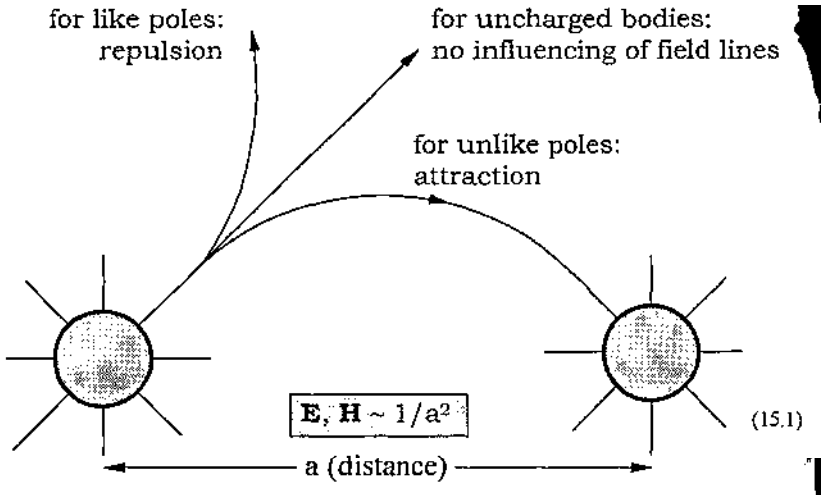
In this chapter we want to turn us towards the technical concepts and techniques concerning "space energy", which occasionally here and there already should have existed or have been operated with quite different success. After Nikola Tesla having pointed the direction more than 100 years ago, the way towards free energy appears to be predrawn. Never before the public interest in the topic of space energy was as big as today. Unfortunately this concerns more the collecting and gathering of rumours and speculations. As in every branch of science also here hunters and collectors can be found. But obviously the hunters, the inventors and theorists have bigger problems, to put something useful on the table. They are fighting against their own not knowing, unuseful textbooks, general ignorance, intolerance and an all-powerful energy lobby. What the collectors on the other hand come up with does make appetite but not full.

An useful and efficient theory might be the most important prerequisite just with regard to the reproducibility of an effect and the product liability of a SET-device. That's why one mustn't expect a complete list of devices of that kind in this chapter, because in the foreground stand the physical and technical explanations concerning the way of functioning, the understanding for constructive and guiding details and the learning from the mistakes and errors of the inventor.
For a better survey the possible courses of the field lines according to the theory of objectivity are listed in detail (table 15.1) and discussed from the top one after another, starting with the strongest known interaction. To complete examples and concepts are presented.

As is well-known there exist electric (E-) and magnetic (H-) field lines. Further exist open and closed field lines and finally is distinguished between the oscillating and the static case. The results are two to the third power, thus eight possibilities of combination in total. In table 15.1 all eight versions are given, even if one or another case is of more theoretical nature. For the objective of a systematizing of different concepts concerning space energy technology the taking apart in any case is helpful. The figure opposite is survey and structure at the same time for the following chapters.

15.1 The course of the field lines

In chapter 6 a relation between the course of the field of a body and its observable interaction has been made (part 1, chapter 6.7 till 6.9). Here a point of approach is offered. For instance to maximize the force effect a magnet or to optimise an electric motor, the engineers nowadays help themselves with costly programs working according to the method of finite elements. In this way they obtain a picture of the field lines, the course of which makes possible conclusions concerning the production of force or torque. The relation without doubt is given, the only question is in which order of magnitude.



(15.1)

Fig. 15.2 A: The course of the field lines leads to a force effect (repulsion or attraction)

repulsion
like poles

attraction
unlike poles

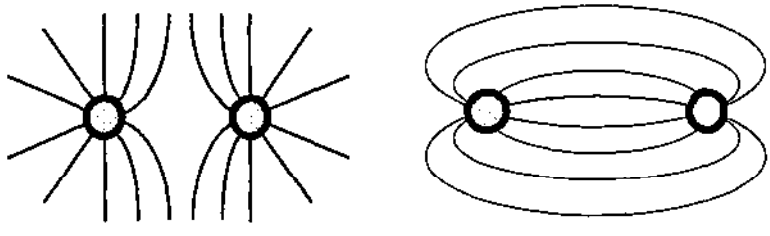


Fig. 15.2 B: The course of open field lines

$$\frac{F_{Coulomb\ force}}{F_{magnetic\ force}} = \frac{Q \cdot E}{\phi \cdot H} = \frac{\mu \cdot Q^2}{\varepsilon \cdot \phi^2} \qquad \text{with} \quad E = Q/\varepsilon \cdot A \quad \text{and} \quad H = \phi/\mu \cdot A \qquad (15.2)$$

where $\phi^2 = m^2 \cdot G \cdot 4\pi \cdot \mu$ (Gl.13.20)

i.e. e⁻:

$$\frac{F_{el}}{F_{magn}} = \frac{e^2}{\varepsilon \cdot m_e^2 \cdot G \cdot 4 \cdot \pi} = 4{,}2 \cdot 10^{42} \qquad (15.3)$$

Fig. 15.2 C: The proportion of forces at the example of the electron.

The theory of objectivity answers the question from the equations of transformation with the proportion 13.23 (fig. 13.4). According to that the electric or the magnetic field strength stand in inverse proportion to the square of a length or of a distance:

$$E, H \sim 1/a^2 \qquad (13.23) \text{ bzw. } (15.1)$$

Less mathematically expressed this, for two bodies in the distance a, where one body is situated in the field of the other, means nothing else as that the distance is reduced. Nearer to the body the density of the field lines again increases, in that way the distance further decreases and we observe an approximation.
Usually the idea of force is introduced as a factor of description and there is spoken of a force of attraction. But that not necessarily is required, because the force only represents an auxiliary description. The cause for the observed attraction rather is the spatial distribution of the field strength.
In this case the two bodies come closer and the mutually active fields get bigger and bigger, until the parts eventually run into each other (fig. 6.7 A). There one comes the thought to increase the force of attraction by an artificial compression of the field lines. In the case of the electromagnetic interaction such a compression actually takes place, since the field lines arise from one pole and end at an unlikely charged pole, which so to speak collects and bundles up the field lines (fig. 6.8 A).
At last we find out the reason, why electromagnetic forces of attraction are bigger than gravitational forces for many powers of ten (between 10^{30} and $4.2\text{-}10^{42}$ for the electron, derivation see fig. 15.2 C)! For table 15.1 this means, at the top have to stand the open field lines, which bundle up at the poles. Then very long nothing comes and after that the effects of closed field lines are being found.

For open field lines however also the opposite of a bundling up is possible. In the case of like poles the fields run away of the other pole (fig. 6.8 B). Between both a space is formed, which is free of field lines, where thus the field tends towards zero, whereas the distance between the poles according to the proportion 15.1 grows towards infinity. In this case we observe, how the bodies are going away from each other. We speak of a force of repulsion, which actually reaches until infinity. This gives reasons for the occurring of both forces of attraction and forces of repulsion in the case of the electromagnetic interaction.

15.2 Gravitation

In the case of closed field lines in principle no repulsion can occur, since no pole, neither north pole nor south pole, neither positive pole nor negative pole is able to influence the position of such a field line. This circumstance as well as the order of magnitude of a possible force of attraction suggest, to settle gravitation here.

It gladly is forgotten, that the field pointers of E- and H-field normally occur together and like in the case of the electromagnetic wave stand perpendicular to each other. It is normal to calculate only the electric field pointers for a charge carrier, without paying attention to the circumstance that the H-field is present as well. The textbooks as a rule remain silent about this dark chapter or they lapidary remark, the dual field lines are closed in themselves and hence inactive anyhow, which however is incorrect.

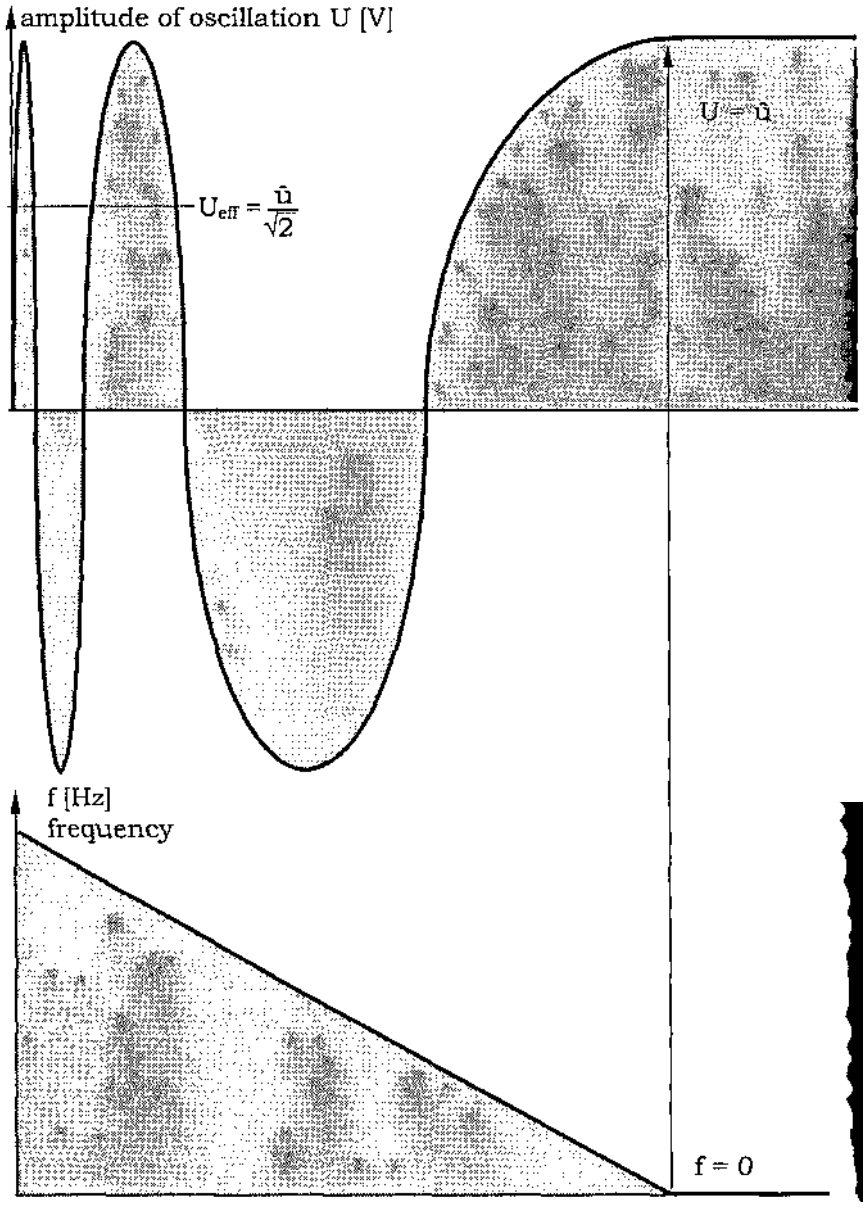


Fig. 15.3: The transition of an oscillating into a static interaction

But, according to the proportion 15.1, they actually develop a force of attraction, even if this is relatively small. No one really needs to be surprised that gravitation is not understood until today, if a whole group of fields simply is overlooked by science! We now also can explain, why there don't exist any massless charge carriers. Namely only the E-field or the H-field can form open field lines and never both at the same time. Otherwise they wouldn't be able to stand perpendicular to each other anymore. The each time other field, in the case of electrically charged bodies it is the H-field, then is wrapped perpendicularly around the E-field lines, independent of the circumstance if electrically an attraction or a repulsion occurs and without exception it forms a weak force of attraction, the gravitation.

15.3 Systematizing the interactions

Next we should know, from which field is to be expected a larger force effect: from the E or from the H-field? At the example of an electromechanical converter this question can be answered concretely.

The forces which occur and form the torque in an electric motor customary in trade are produced by magnetic poles in stator and rotor, which repel each other in the case of like charge and attract each other in the case of unlike charge. Now there in principle exists the possibility to build a motor which works with Coulomb forces, thus with positive and negative poles, instead of the magnetic forces. About such designs numerous patent specifications exist, but no customary version on the market.

The reason very simple is that a magnetic motor for the same torque is many times smaller and better priced. From this the conclusion can be drawn that for the same construction volume a magnetic force F_M is considerably larger than a Coulomb force F_E, which for instance binds together atomic nucleus and atomic hull.

Thus in table 15.1 the magnetic forces are ranked before the Coulomb forces.

Finally we have to distinguish between the static and the oscillating case, which are distinguished in the frequency. In fig. 15.3 an oscillation is shown, which by chance just at the moment of the vertex value changes into the steady state, thus takes the frequency zero. In this case the effective values between a static and a sinusoidal oscillating interaction are distinguished by the factor $\sqrt{2} = 1.4$.

If we operate an universal motor with direct current, then it releases more power, than for a corresponding feeding with alternating current. Even a high-tension line, which stands at maximum 511 kV, is operated with alternating current up to 380 kV, with direct current on the other hand up to 500 kV. Consequently in table 15.1 the static interactions stand before the oscillating interactions.

The strong interaction naturally isn't found in the list, after it has been derived that it doesn't exist at all (see chapter 7.8), whereas the weak interaction is hiding behind the oscillating interaction. It shakes other particles so long till they fall apart (see chapter 7.13).

We now would be as far, to discuss the 8 cases listed in table 15.1 one after another by means of practical examples.

The principle of the side-pole machine

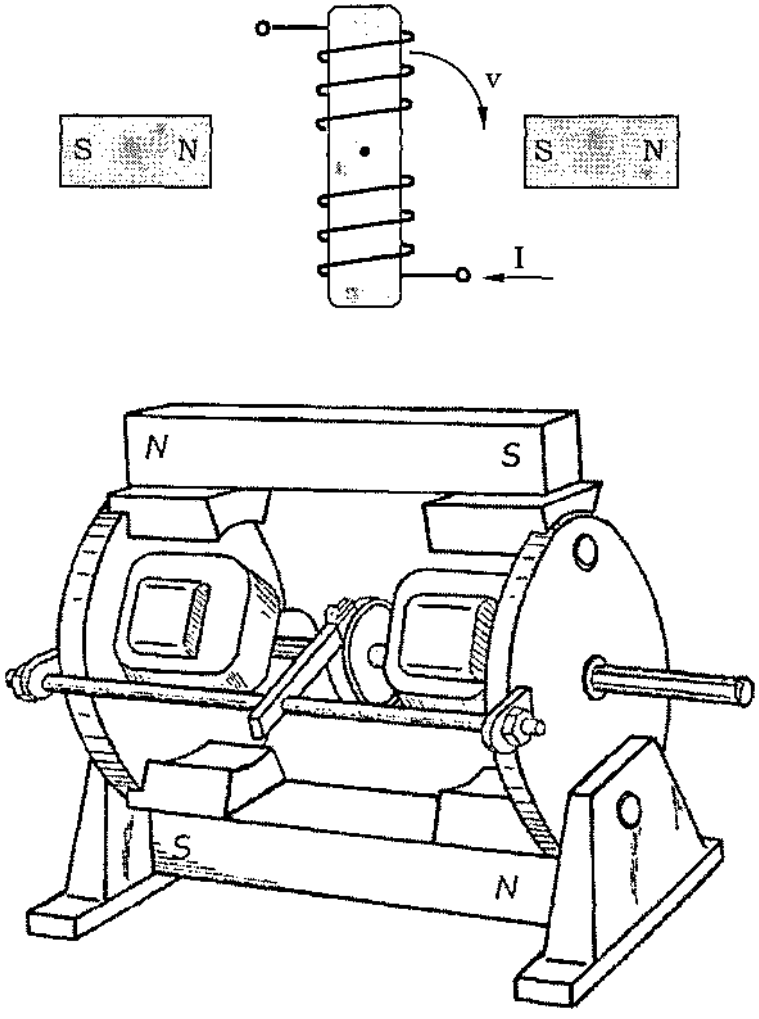


Fig. 15.4: Alternating current dynamo, according to the inventor
(Kromrey) a magnetic converter for free energy with a degree of effectiveness of more than 100 %.<i>

<i>: Raymond Kromreys Molekularstromrichter, NET-Joumal 6/98, S. 5

15.4 Magnetic force converter

As a result of the systematizing of all eight possible interactions, the largest force effects are to be expected as a result of static and of open magnetic field lines. It is questionable, if this statement is generally valid and is true everywhere in space. But it is valid at least for a terrestrial laboratory and only here, on earth, a solution for the energy problem is strived for. No wonder therefore, if the electric energy technology nearly without exception is using these force effects. We find them at a solenoid, at a relay coil, at a magnetic tuning cylinder and equally between the stator field and rotor field of an electric motor.

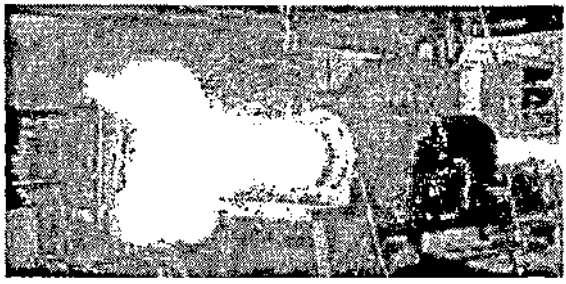
The motor however takes a special position, because its rotor is turning. In that way a switching of the winding and commutating of the currents is necessary or the field of the stator winding is being turned, for instance in the case of an alternating current motor. This is necessary, so that in the air split of the motor the fields from the stator and rotor always are standing opposite like for the solenoid and a driving force can be formed. For the operation therefore oscillating currents are necessary, so-called alternating currents, which are fed in into the winding with the right frequency and phase. There can be spoken of an operation in resonance. It surely is no coincidence, that Nikola Tesla, the founder of the rotary field theory and inventor of the alternating current motors at the same time is the discoverer of the neutrino radiation!

The electric motor slides already into the second column from the top in table 15.1, as we see, and should be assigned to the case of the oscillating interaction of open magnetic fields. The frequency for motors usually is very small.

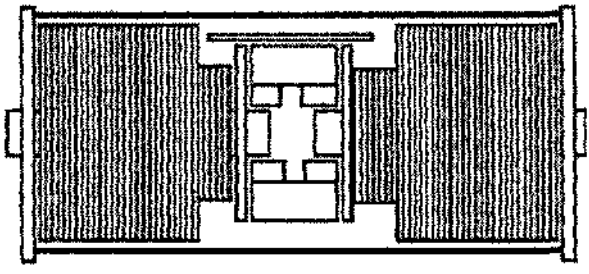
But also at high frequencies there can't be reckoned on some free energy which would show or even be utilizable, as can be heard from the inventors who tinker with magnets, mostly with permanent magnets (Fig. 15.4). The reason very simple is that there exist no physical particles, which could mediate this interaction. Magnetic monopoles would be necessary, thus north pole or south pole particles, so that an interaction with the open H-field lines can occur.
Such particles could form as a result of currents and eddy currents, but for that a good conductivity would be necessary and that isn't present in the vacuum. Therefore magnetic monopoles can't exist at all! This point we already had worked out (fig. 4.4, question I). The same statement then also applies to the oscillating case.

If nevertheless something like free energy should show in the case of some magnetic field converters, then unnoticed by the inventor still other physical effects are added. By means of concrete concepts this circumstance can be studied and discussed.
The meanwhile well-known railgun is a corresponding example, for which besides the used magnetic force unintentionally a further principle is used. A more detailed occupation with this device is worthwhile, because here some fundamental concepts of space energy get clear.

A: Shining railgun in action<i>



B: Structure<i>



C: Concerning the way of functioning of the railgun

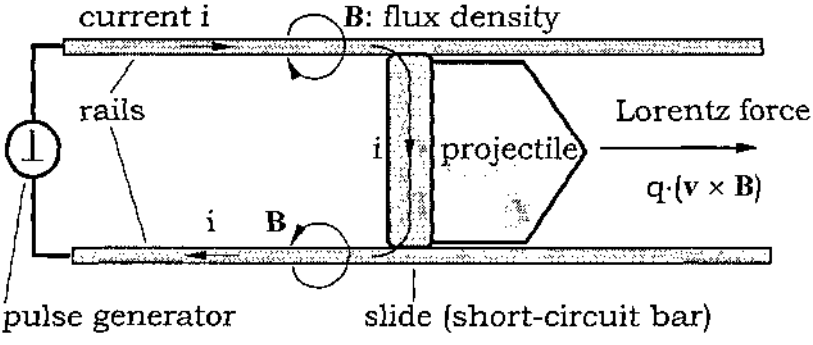


Fig. 15.5: Structure and way of functioning of the railgun

<i>: in the internet under: www.glubco.com/weaponry/railgun.htm

15.5 The railgun

The engineers and physicists involved in the SDI-project were quite astonished, as they had a close look at the bent rails of their gun. During the test operation the equipment was really flying around their heads.
They were very sure to only have fed in 16.7 MJ of energy, from the rotation of a homopolar generator, because more was not available for the experiment by any means. The projectile with mass m_0 = 0.317 kg lying on the rails thereby should have been accelerated to the velocity of 4200 m/s. Instead huge forces were at work here, which the construction couldn't counteract at all. There is talk about the released energy having amounted to 399 GJ, what corresponds to an over-unity effect of 24000<ii>. This factor describes the proportion of the released to the taken up power or energy.
If these details should be correct then this would be the most efficient converter for free energy, which has been developed until now.

Behind the project name SDI (Strategic Defence Initiative) is hiding the by the United Slates prepared "Star wars". But how one fares a war, which nobody can pay anymore and no-one wants, entirely according to the motto: There is a war and no-one goes there? This war undoubtedly the strategists and initiators themselves have lost, who even had to watch, how their space gun appears in the internet with design drawings and rich visual material to be called by anyone<i>.
Today, where we are surrounded by nothing but friends, where in Russia and at other potential opponents is fought more against internal problems and one lets the expensive space toy rot for lack of money, the coat of the military secrecy obviously no longer can be held over such an explosive project as the railgun.

Thus informative details have reached the public. In the pictures a bright lightning can be seen at the moment of launching (fig. 15.5 A). Here presumably is being materialized, in which the part of anti-matter annihilates with the particles of matter under emission of light. There thus takes place the same process as in the case of lightning or the shining of the sun.
In addition is being reported that heat energy is withdrawn from the environment, a circumstance, which is typical for all functioning converters for space energy. We thereby are reminded of the possible formation of ice in a lightning channel.

Like for a lightning also the railgun is stimulated with a very high excitation voltage and with extreme speeds of change of the tension voltage (high du/dt) (fig. 15.5 C). From the setup it concerns a bridge of Ampere, which in various respects appears to be superior to the rocket engines, after the costly transport of the propellant into space isn't necessary, since the capacitor batteries can be recharged by solar power.

<i>: e.g.: www.glubco.com/weaponry/railgun.htm

<ii>: Galeczki, G., P. Marquardt: Requiem fur die Relativitat, Verlag Haag + Herchen (1997), S. 139

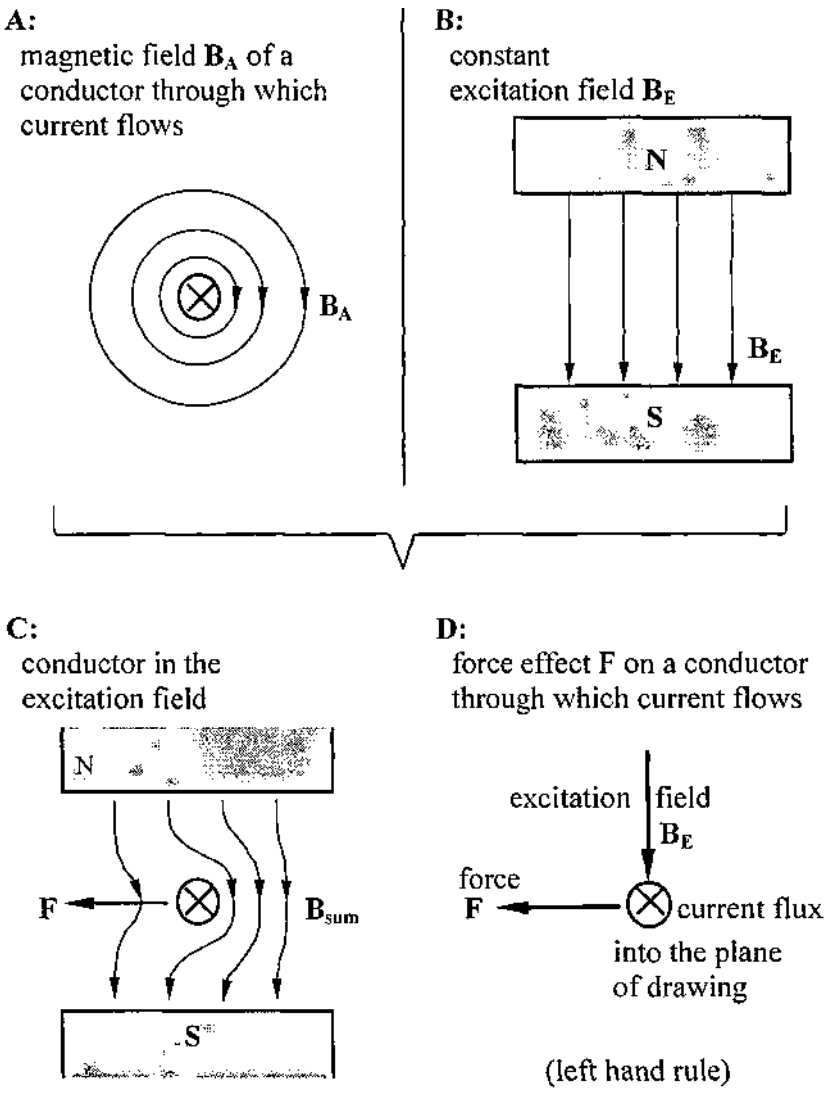


Fig. 15.6: ____ The distribution of field lines and force effect on the slider of the railgun through which current flows in a permanent magnetic field

The projectile has the form and the function of a short-circuit bar and is guided slidable between both rails of the railgun. The high-tension capacitors are switched on both rails at the moment of launching, so that in a very short time an extremely high short-circuit current of several thousands of Ampere flows through the bar.
Since the bar in addition is situated in a static magnetic field, there acts an accelerating force on it (fig. 15.6 D). It is the force effect of a conductor through which flows a current in a magnetic field, like it is active in every electric motor. If we overlap the fields of the conductor (fig. 15.6 A) and of the magnetic field (15.6 B), then we observe a bending and lengthening of the field lines (15.6 C). There exists the effort to re-establish the original state, which represents the smallest magnetic resistance, and for that the conductor is shifted out by means of the arising force. In the sketch it is accelerated to the left. That far the explanation concerning the bridge of Ampere. That has nothing to do with free energy. For the enormous degree of effectiveness, as it has been determined, further effects have to be added.

15.6 Unipolar induction

The projectile, or from the function let us rather speak of the short-circuit bar or the slider, at first is entirely conventionally accelerated and experiences, mathematically expressed, a dv/dt. The magnetic field B stretching perpendicular to the movement is constant, so that according to the Faraday relation<i> E = v x B from the velocity v an electric field strength E results and from the acceleration dv/dt a field change dE/dt. These open field lines along the length of the slider, in particular the oscillating part, appears to interact with oscillating particles and to collect these particles<ii>. It concerns presumably neutrinos, which primarily materialize in charge carriers. These contribute to the current flux in the slider and to the acceleration, whereupon still more neutrinos are collected.
A hardly controllable avalanche effect is formed. Only if the change in tension voltage has worn off and the capacitor is completely discharged, also the resonant interaction will again collapse.

The inventors, who want to construct a civil version of the railgun, is given a warning on the way which should be taken seriously. At first it doesn't take particularly much imagination to imagine a rotating arrangement of the gun, a construction with one axis, whit which a generator driven, which produces power. A small part is supplied the system again as supply for itself. The rest would be available free to the consumers as non-polluting, regenerative energy.
That really sounds good, if there wouldn't be this one obstacle.

<i>: The equation of transformation concerning the unipolar induction already was treated more detailed in chapters 6.4 and 9.3

<ii>: It is the resonant interaction according to table 15.1, line four

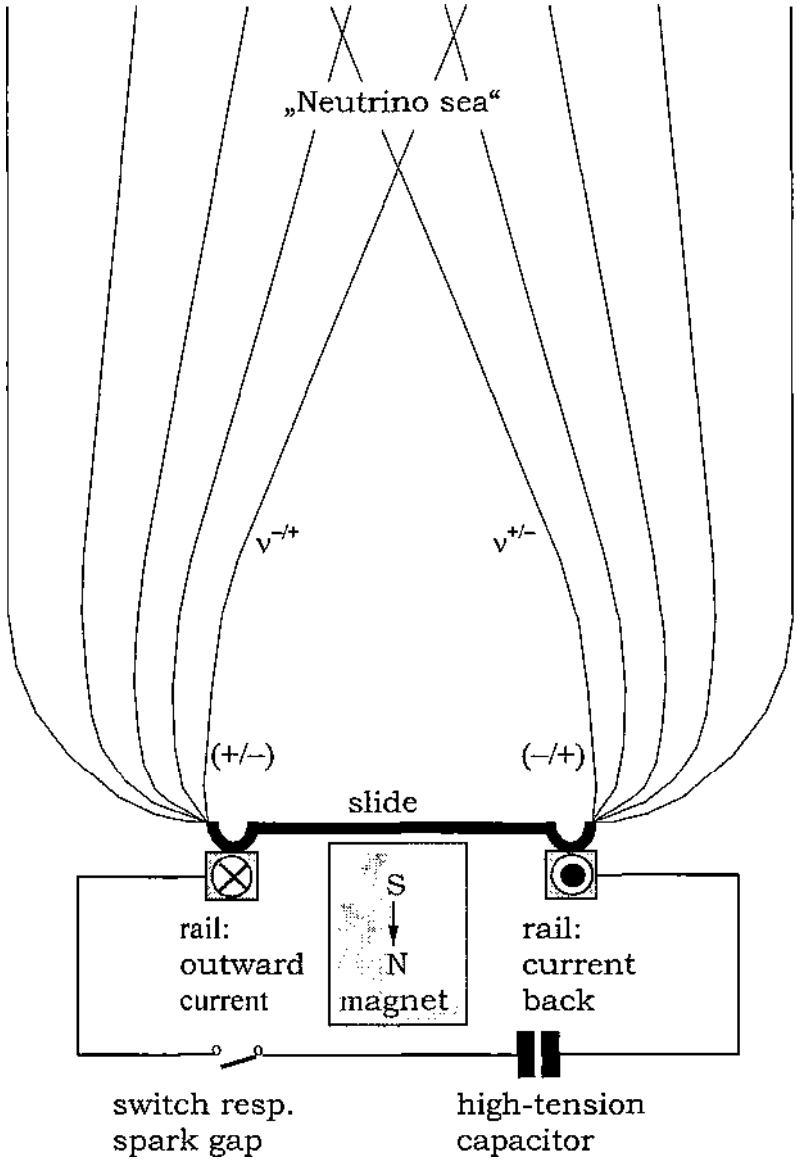


Fig. 15.7: The collecting of neutrinos by oscillating open field lines

15.7 Tendency to instability

In a continuously working machine the discharging of the capacitor cannot remain a single event as in the case of the gun. The discharging and the recharging has to take place cyclic depending on the revolutions per minute. To obtain a rotating movement even to a certain extent ignition has to follow ignition. But if the new ignition takes place, although the avalanche effect of the last one still hasn't worn off, then inevitable a catastrophe will occur, then the work of wonder is taken apart under the eyes of its creator. Numerous inventors already have had to collect such painful experiences. It is assumed that not even Nikola Tesla had escaped, as he had to put away again his stately luxury car with electric motor and energy converter in a barn near Buffalo already after one week of test operation in the year 1931<i>.

Of course also for this problem solutions in accordance with engineering are offered. Meaningful would be a restriction of the revolutions per minute and a power regulation. Only most inventors don't think that far. On the one hand, because they handicraft without an useful physical model and on the other hand they think they already have reached the goal, if they observe something like free energy for the first time. Just as fast as the joy then the disillusionment comes, because a converter which doesn't work, is not able to convince anyone.

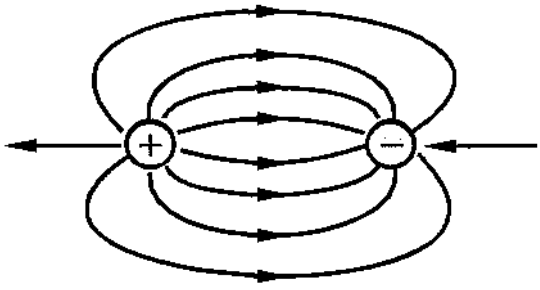
Tesla already was aware of this set of difficulties. He fastened his converter to the dash-board and not in the engine compartment, presumably to adjust the coupling of the coils from the drivers seat during the drive by means of two metallic rods, which he pushed into the case. But sometime even this regulation by hand has to go wrong, because the collected neutrinos on their part collect further neutrinos (fig. 15.7), so that in the case of an unfavourable order of ignition an additional amplification is possible. For a reliable operation according to that directly or indirectly the phase of the ignitions to each other should be checked.

At the example of the railgun space energy technologists and inventors can study the relations and the way of functioning very concretely and even calculate these relatively simple. It is a big relief, that all three vectors stand perpendicular to each other: the E-field, the B-field and the velocity v. Ideal conditions both with regard to a maximizing of the wanted accelerating force and for the resonant interaction, increase at the same time the collecting of space quanta, which probably may be set equal to the neutrinos. This is made possible by the Faraday's law of unipolar induction. In that way at the right and left end of the slider a positive a negative pole each are formed. The further the two poles are away of each other, the more the field lines are opened and the more neutrinos can go into resonance. In this place still considerable improvements and optimisations are possible.

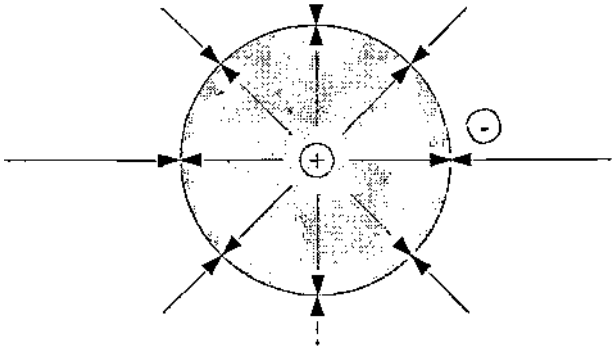
In addition to the two discussed the phenomenon of the electrostriction is added as a third phenomenon, which authoritatively contributes to the conversion of neutrinos into electrons. It is a field dependent change of length, which in the case of lightning takes care of the thunder and in both cases, therefore also here, is active as a charge carrier producer.

<i>: see also chapter 9.5 Free energy,
A. Schneider: Energien aus dem Kosmos, Jupiter-Verlag 1989, Kap.ll, S. 20 and H. Nieper: Revolution, MIT-Verlag 1981, S. 194

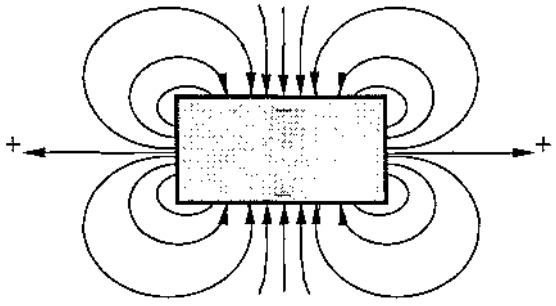
A: electric dipole (e.g. electrostatics, see also fig. 6.8)



B: electric monopole (e.g. electron e~, see also fig. 4.3)



C: Mixed form in the case of cylindrical symmetry



15.8 Unipolar field configuration

If we again go back to fig. 5.1 and continue our considerations with examples concerning line 3. The obtainable force effect of open electric fields indeed is for powers of ten smaller than that of magnetic fields, but then particles are mediated, an invaluable advantage and an indispensable prerequisite with regard to the generation of space energy. As long as the particles are considered in the balance sheet of energy then in addition by no means can be claimed, space energy converter are perpetuum mobiles.

In the question, why only electric particles can be mediated, has to be pointed to the repeatedly mentioned circumstance that only electric particles can be formed as a result of the concentration effect of potential vortices. Magnetic particles however plain and simple cannot exist, since for missing conductivity in the vacuum no eddy currents are possible (see fig. 4.4).

In the case of the arising Coulomb forces again is distinguished between the static and the oscillating case. We want to start with electrostatics.

The range of technical applications of static electricity is large. It stretches from varnishing technologies and filter technologies till the fly grill in the arbour. In all cases the field is built up by charge separation. By means of a high-tension generator a positive pole and a negative pole are produced, between which the field is stretching. The field lines now start at one pole and end at the other, unlike pole (fig. 15.8 A).

In this manner almost no open field lines are available, which point to the outside and could interrelate with free particles. If one for instance intends to attract and collect charged particles from the solar wind, from the cosmic radiation or from the electricity of the air, then the design in one point has to be changed fundamentally.

A unipolar field configuration is necessary. What is meant with that, answers a glance at the spherical vortex model of the electron (fig. 15.8 B resp. fig. 6.2). Here it as well concerns a formation of dipoles as a result of the charge separation, but one pole is hiding in the inside of the other pole . In that way its field lines are captured and don't have a chance anymore to come out, to reach the other pole.

But if the pole lying on the outside for its part can't close its field lines any longer, then these point helpless into space and search in their neighbourhood, in the distant world and if need be even in the infinity of the universe an unlike anti-pole, which as a result interacts and is attracted.

The measuring technician analyses these open field lines and falsely calls the construction then a monopole, only because he isn't able to reach the locked up pole. To blame is the unipolar field configuration, which with that probably would be explained to a certain extent.

The designer and inventor as well might have realized how he has to construct his device, with which he generates open field lines to collect space quanta. He has to lock in one of the two poles as good as possible. Optimal would be of course a spherical symmetric construction like in the case of the elementary vortex. Compared with that a cylindrical symmetry indeed is suited far less good, but it offers constructive advantages (fig. 15.8 C).

We now will report of such a functioning device.

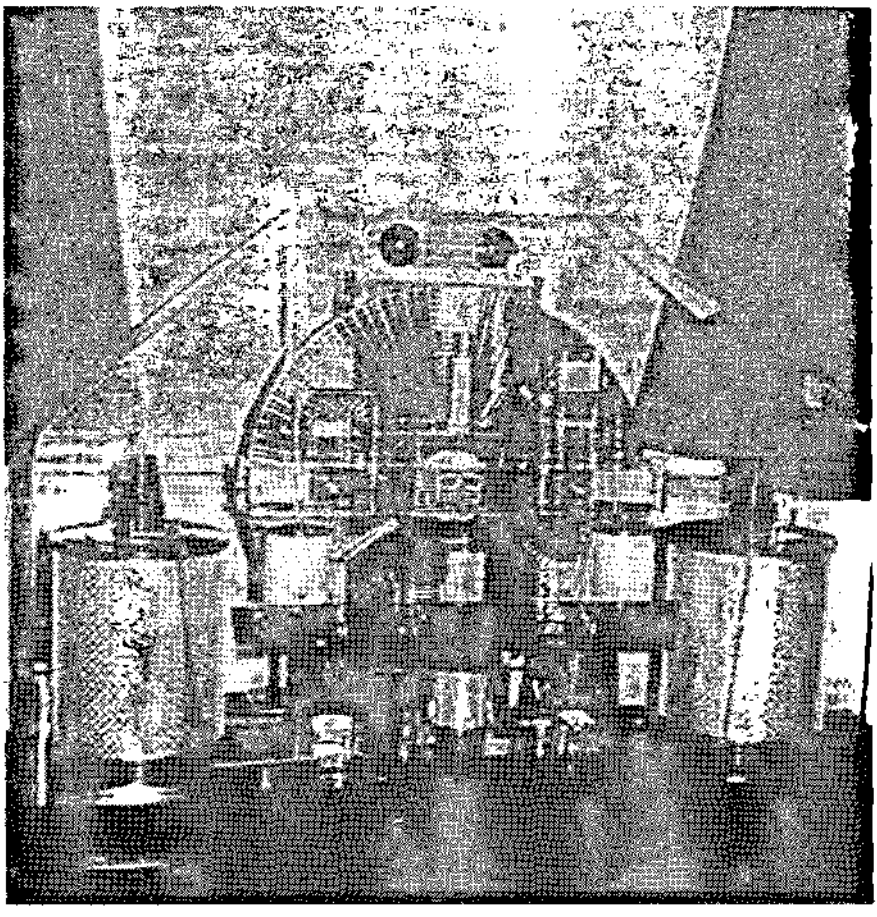


Fig. 15.9: Demonstration converter "Testatika".[<i>]

<i>: A. Schneider: Energien aus dem Kosmos, Jupiter-Verlag 1989, S. 29,
I. Schneider: Neue Technologien zur Freien Energie, Jupiter-Verl. 1994, p. 13 and in the NET-Journal, Heft 8/9, 1997, S. 16 as well as iss. 12, 1997, p. 6.
D. Kelly. Der Schweizer ML-Konverter, Raum & Zeit Special 7, S. 164

15.9 The Testatika

An electrostatic device, which produces open electric field lines, is situated in Linden in Switzerland. It optically is very imposing and belongs to a religious community, which has called it Testatika and is of the opinion that it is a free energy converter. Inexplicably the Testatika does not serve the community, which generates their electric power conventionally and to a large extent by itself, as a source of energy. Instead the 2 kW device only very seldom is demonstrated for special occasions or to select groups of visitors. The religious community after that explains the astonished observers humanity not yet is mature for the technology.
Perhaps just the opposite is correct and the technology not yet is mature. According to my personal assessment such an electrostatic device in principle is entirely unsuitable for the continuous operation.
It can be expected that the open field lines sooner or later will interrelate with the electricity of the air and thunderstorms are being attracted by the infernal machine so long until lightning strikes and the demonstration with that has finished. That's why the Testatika may be switched on only for a short time, only at sure weather situation and not too humid air, and many a registered visitor has been sent away without having seen the "thunderstorm machine".
As an object of demonstration and study the Testatika however is well suited. Alone the circumstance that no cable leads to the device and it nevertheless releases energy in the order of magnitude of 1 till 2 kW, surprises all visitors. At least the impression is mediated as if the machine would violate the law of conservation of energy, which is not correct. The Testatika is similar to an induction machine, which works with friction electricity. Thereby the unlikely charged bodies do not have to unconditionally touch and rub at each other, it already is sufficient, if they are brought in the immediate vicinity of each other. In the case of the Testatika the electrostatics of two against one another rotating discs is taken off by brushes.
The excitation energy presumably is taken out of the natural E-field, which just like that can amount to 200 Volts per meter (see chapter 2.9). The large diameter of 80 cm of the discs and their bad conductivity (acrylic glass) permit this conclusion. The charge taken off by the brushes afterwards is temporarily stored in two capacitors of 2 Farad at 300 Volt, so-called Leyden jars. This far one actually is reminded of a Wimhurst generator, in which the energy is supplied the system by turning the disc. Large powers cannot be drawn by that. Plans to build such an induction machine by yourself have been published<i>.
In the case of the Testatika however two discs are used and by hand stimulate to rotate oppositely. This rotational energy in this case isn't used to produce power, otherwise the discs quickly would stand still again, but that doesn't happen.
Until now apparently no-one has discovered the secret, which is kept strict by the members of the community. In my opinion the energy situation on our earth however is too serious, as that we would be able to afford playing hide-and-seek and egoistical secretiveness.

<i>: I. Schneider: Neue Technologien zur Freien Energie, Jupiter-Verl. 1994, S.14

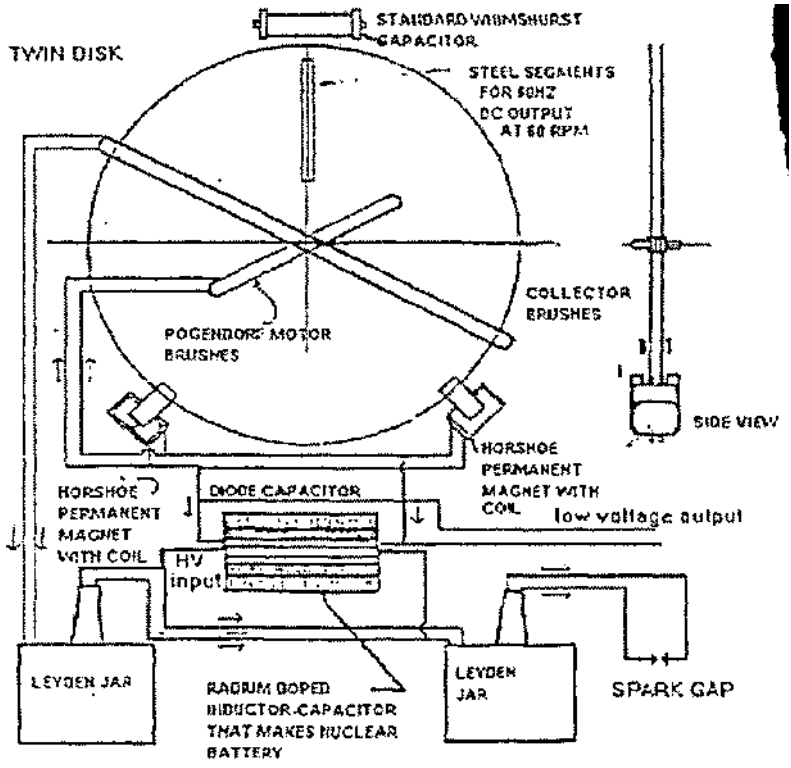


Fig. 15.10: Sectional drawing of the Testatika according to Don Kelly, (Clearwater, Florida, USA)

<i>: Der Testatika generator, NET-Journal, Dezember 1997, page 6 similar picture is found in Raum & Zeit Spezial 7, page 164

15.10 The secret of the Testatika

The crucial point is the opposite direction of rotation of both discs. If we assume the static earth electric field is the cause and serves as an excitation field, then as an effect a field arises, which stands perpendicular to that. The axial component now points out of the centre of the disc.
In the case of only one disc the field lines in front and behind the disc again are closed, so that no open lines can form. With one disc or with two discs rotating in the same direction hence no unknown charges can be attracted.
In the case of two oppositely rotating discs however shows one component along the axis of rotation to the observer, that of the other disc exactly in the opposite direction. In that way between both discs a pole is ,,pinned", which no longer is able to close all field lines on the outside around the machine. Thus open field lines and a, however incomplete, unipolar arrangement are formed.
The charge carriers sucked from the electricity of the air as a result support the natural electrostatics and speedy recharge the capacitors, even if up to 10 Amperes are taken out by the consumers.

The ingenious thing of the machine is its extremely simple construction and the simple concept.
If one includes the collected particles also in the balance sheet of energy, then it thus will turn out that the law of conservation of energy is not violated at all. There thus can't be talked of free energy. In this context the Testatika may rather be given as a counterexample. Air ions are the carriers of the electricity of the air and not carriers of free energy.

Negative air ions are indispensable for our welfare. One should only remember the first men in space, who after the landing were pulled out of their capsule more dead than alive, after they had to stay in the unhealthy atmosphere of the capsule for a longer period of time. Only the installation of ionising devices for negative air ions made possible longer staying in space.
The taking out of the air of negative ions hence is not unproblematic and not particularly ecologically compatible. An atmosphere harmful to life is formed which Dr. Wilhelm Reich has called DOR-state. He by the way has designed a Cloud-Buster, with which he could take static electricity, forming above the desert sand, out of the air. In that way the negatively charged rain clouds no longer are repelled and driven away. Reich has tested his weather machine 1954 in the desert of Arizona. After he had freed the atmosphere of the ,,DOR-strain", as he expressed himself, in the desert area the atmospheric humidity steadily increased from 15% up to 95%, there grew prairie grass and everything started to turn green, and eventually after many years for the first time rain fell again.

Static electricity, as far as the right polarity is chosen, may conditionally be used for the mechanics of rain making. For free energy concepts it however isn't suitable. Already Nikola Tesla has pointed to the circumstance that our hopes will be in vain if the free energy would be of static nature (see fig. 9.5). He in his speech, which he gave 1891 before the AIEE, has left no doubt that free energy exists, which is kinetic and with that energy technically usable for us,.
Chapter 16 will be occupied solely with this case<i>.

<i>: according to point 4 in table 15.1

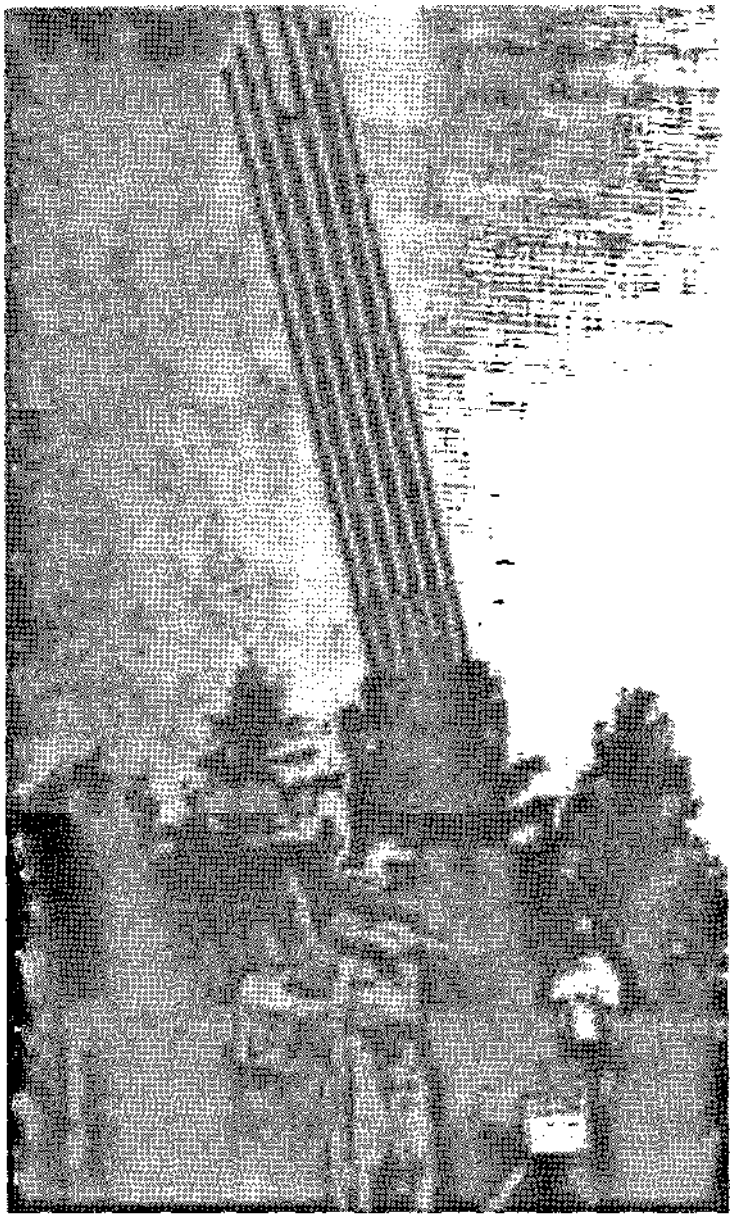


Fig. 15.11: The Cloud-Buster of Dr. Wilhelm Reich 1954.[<i>]

<i>: H.-P. Thietz: Tatort Erde, VAP (1996), ISBN 3-922367-62-3, page 122
<ii>: Part 1, fig. 9.3; concerning the unipolar induction see also fig. 6.5 and 11.8

Fig. 15.11 shows the weather machine of Reich, the Cloud-Buster. It can be understood only hard, why Reich directs a 3-4 m long metallic pipe with a diameter of 4 cm to the sky and connects the rear end with a deep well or with flowing waters. The effect should have been increased considerably with a few milligrams of radium. An indication that he must have worked with static electricity, delivers however a tragic accident, in which one of his collaborators was lamed on one side. He carelessly had touched the charged apparatus and suffered an electric shock<i>.

15.11 The key to free energy

As a contribution to the discussion the individual principles of functioning of space energy again are collected and the attempt is undertook to value them.
In the case of an oscillating dipole configuration, for instance the railgun, open field lines are present only along the mutual line of connection (fig. 15.8 A). With that not particularly many space quanta can be reached. It hence has to be operated with gigantic excitation powers in the range of many thousands of Ampere, so that further field lines fling open and interact. The wanted over-unity effect therefore can only be reached at an enormous expense of technical apparatus.
An unipolar arrangement here is considerably more advantageous, where holds: the more unipolar, the fewer excitation power is required. But in that way it can take longer until the collecting of neutrinos like an avalanche again has worn off. In the case of an ideal spherical arrangement (fig. 15.8 B), as the ball-lightning takes, the process can even last for minutes. This explains why unipolar systems can be kept under control only very hard. If the neutrino avalanche is rolling then it purely theoretical only can be stopped with a still larger excitation power, for instance by phase shifting, what can hardly be realized in practice. The rolling avalanche can't be stopped anymore by normal means. A synchronous operation between the neutrino oscillation and the converter can, apart from the technologically hardly realizable high frequency, by no means really be recommended. As a rule one single steep flank of the change of the excitation voltage is sufficient to start the avalanche. By means of the repetition frequency or by means of the duty cycle of the excitation voltage then resonances to the neutrino field can be made or avoided. On the other hand can't be done without the avalanche effect. The utilizable power of the neutrino converter otherwise would be much too small. This case should be pursued further in the design of a longitudinal wave gauge.

All converter systems at first work based on a well-known and tried and tested physical principle of functioning. In the case of the railgun it is the bridge of Ampere. The thus used force effect on a conductor through which flows current is advantageous due to the obtainable order of magnitude and as a basic concept extremely recommendable. But also Coulomb forces or other physical principles can be used.
Despite that a further relation still must be added, which produces the interaction with the neutrinos. Closely associated with the unipolar arrangement it is the unipolar induction, which in virtually all space energy concepts is put to use. It already could be shown that the railgun uses the effect as well as John Searl in the case of his flying disc<ii>. The Faraday law of induction turns out to be the key to free energy.

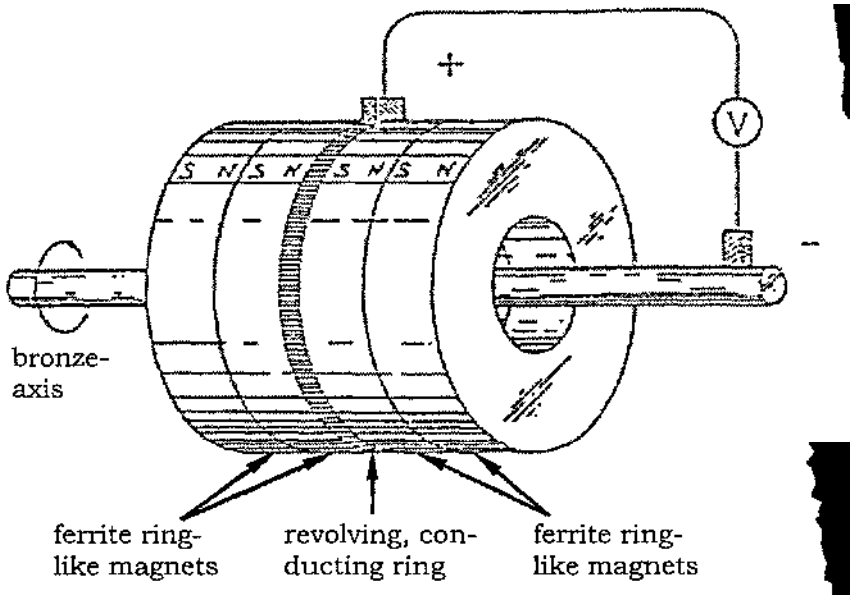


Fig. 16.1: The Faraday generator, which with rotating magnets is called N-machine.[i]

According to chap. 6.5, eq.60 the equations of transformation are:

$$\mathbf{E} = \mathbf{v} \times \mathbf{B} \quad \text{and} \quad \mathbf{H} = -\mathbf{v} \times \mathbf{D} \tag{16.1}$$

where: $\mathbf{v} = dx/dt = v \cdot \mathbf{e}_x$ = component of the direction of motion perpendicular to the area being stretched by the field pointers $\mathbf{H} = H \cdot \mathbf{e}_y$ and $\mathbf{E} = E \cdot \mathbf{e}_z$.
Thus in addition to the basic fields E and H (at v = 0) additional fields E_z and H_z, depending on motion, occur and the overall fields E_o and H_o are measured (which corresponds to eq. 63 in chapter 6.5):

$$E_o = E + E_z \quad \text{and} \quad H_o = H + H_z \tag{16.2}$$

(which corresponds to eq. 62 in chapter 6.5):

with: $E_z = v \cdot B$ and $H_z = -v \cdot D$ (16.3)

Table 16.2 A: The equations of transformation of the electromagnetic field.[ii]

16. Space energy technology (SET)

It quite concretely concerns the question for a technology concerning the use of the resonant interaction (according to line 4 in fig. 15.1). For that open and at the same time oscillating electric field lines are needed, which mediate neutrinos and pass them on to a receiver working in resonance. The sun, some planets and other celestial bodies, as we already have worked out, use the effect. Even an entire galaxy is kept together in this way. This interaction plays the crucial role for the theme of space energy and the question is asked, with which technology it can be produced artificially.

16.1 The unipolar generator

The most direct way obviously leads over the Faraday relation concerning the unipolar induction. With the classic Faraday generator, where a permanent magnet is turned along its axis, at first a static electric field can be produced. By rotating in opposite direction or magnets rotating in the same direction but oppositely poled, relatively simple one pole can be „pinned" between the magnets and an unipolar construction can be built. Numerous research scientists already have worked in the area of the Faraday machine more or less successfully (fig. 16.1)<i>. There is reported of instabilities and of the picking up of unknown energy at high revolutions per minute. In the majority of the cases it in a sense of the Testatika will concern collected electricity of the air.

The Faraday relation in addition also appears to be hardly understood correct physically by anyone. A scientific magazine in this context takes the opinion: "Faraday proves Einstein wrong", and the production of electricity with Faraday's unipolar inductor violates the laws of physics !<ii>

<i>: A. Schneider: Energien aus dem Kosmos, Jupiter-Verlag 1989, S. 44

<ii>: „Faraday in his experiment did let rotate a copper disc above a resting cylinder magnet; as expected in a loop of wire a tension voltage was created (F-machine). Than he let the magnets rotate, and the disc stood still; now again a tension voltage should have resulted - but there was no voltage. In the third experiment the magnet rotated with the disc in the same direction and with the same speed. Because there was no relative motion between both, an induced tension voltage wouldn't have been expected - but it was measurable! (N-machine, see fig. 16.1).
What does that mean? If the relative movement between magnet and disc is not always crucial for the formation of an induced tension voltage, then also the absolute movement has to play a role - because something has to move, for a current being formed. But an absolute movement according to the theory of relativity can't be detected - thus Faraday's experiment proves Einstein wrong! Therefore you won't find anything about this experiment in the textbooks".
Taken out of the article: Faraday widerlegt Einstein, PM-Magazin 11/ 1998, P. 133

from table 16.2 A:

$$H - H_o \overset{(16.2)}{=} - H_z \overset{(16.3)}{=} v \cdot D \qquad (16.4)$$

with the velocity $v = dx/dt$,
not accelerated $dv/dx = 0$ (inertial system) and derived for x:

$$\frac{dH}{dx} - \frac{dH_o}{dx} = \frac{dx}{dt} \cdot \frac{dD}{dx} = \frac{dD}{dt} \qquad (16.5)$$

The curl of the H-field pointer points in the z-direction:

$$\text{rot } \mathbf{H} = \frac{dH}{dx} \overset{(16.5)}{=} \frac{dH_o}{dx} + \frac{dD}{dt} \overset{!}{=} \mathbf{j} + \frac{d\mathbf{D}}{dt} \qquad (16.6)$$

comparison of coefficients with Ampère's law:

$$dH_o/dx = \mathbf{j} \quad , \qquad (16.7)$$

integrated over dx and ds and formulated generally valid:

$$\oint \mathbf{H}_o \, d\mathbf{s} = I_{ein} \qquad (16.8)$$

thus follows from that: magnetic field ≈ vortex field!

Faraday's law of induction (analogous derivation):

$$\text{rot } \mathbf{E} = \frac{dE}{dx} = \frac{dE_o}{dx} - \frac{dB}{dt} \overset{!}{=} - \frac{d\mathbf{B}}{dt} \qquad (16.9)$$

cause for measurable electric field E_o is missing:

$$dE_o/dx = O \quad , \qquad (16.10)$$

integrated over dx and ds and formulated generally valid:

$$\oint \mathbf{E}_o \, d\mathbf{s} = 0 \qquad (16.11)$$

thus follows from that: the electric field = irrotational (according to Maxwell)!

Table 16.2 B: The derivation of Maxwell's field equations (Ampère's law and Faraday's law of induction) from the equations of transformation of the electromagnetic field

The author of the article proceeds from Maxwell's formulation of Faraday's law of induction, according to which arises a tension voltage in a wire if the wire cuts magnetic force lines, thus is moved relative to a magnet.
If he had read my books, then he would know that Faraday not only has found the older, but also the more comprehensive law, whereas Maxwell only describes a special case. Starting-point for the by me developed theory of objectivity are on the one hand Faraday's law of induction and on the other hand the regularity dual to that, which both together are called equations of transformation of electromagnetism (fig. 6.5, eq. 60 and fig. 16.2 A, eq. 16.1).

16.2 Derivation of Maxwell's field equations

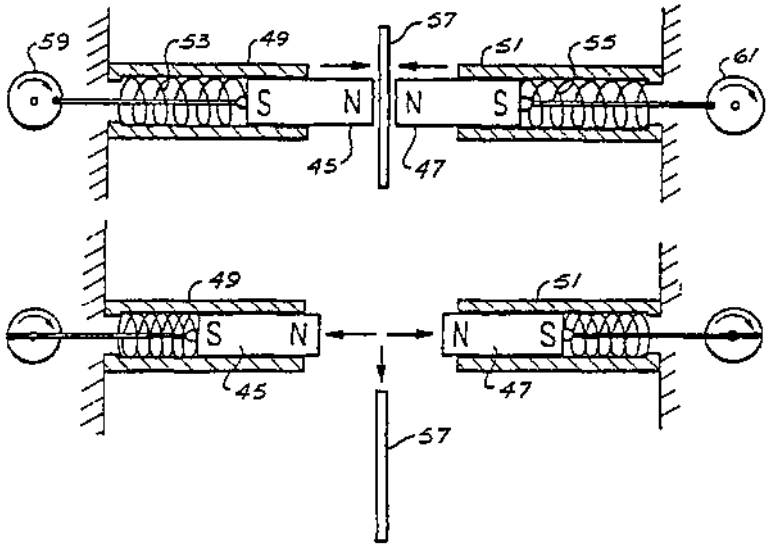
For the derivation we assume, as already in fig. 6.5 for sake of simplicity, that the movement $v = v_x$ takes place perpendicular to the area stretched by the field pointers $H = H_y$ and $E = E_z$. If we derive the equation of transformation, written down for a field component depending on motion, for the coordinate x by using the equations of material and compare the result with Ampere's law resp. Faraday's law of induction, then it becomes clear that the comparison is successful only under certain prerequisites. This circumstance proves that the Maxwell equations only describe a special case and that the equations of transformation are more general valid and causal (table 16.2 A and B).

But in this place is crucial that Faraday's law of induction according to Maxwell only is able to describe a formation of dipoles. For the formation of unipolar field structures however must be fallen back upon Faraday's law concerning the unipolar induction. Whoever wants to understand or even develop by himself concepts concerning space energy, first must have understood Faraday's law in its whole range.

Usually the Faraday generator is, like in the original building shape, equipped with permanent magnets and operated in a steady operating state. Doing so consequently only static electricity is formed. We however need oscillating fields, and for that either the rotation, or the magnet should be changed in polarity with high frequency. Expressed with the precision of mathematics, the first case is described by: $E(t) = v(t) \times B$ and the second case by $E(t) = v \times B(t)$. Both cases have to be investigated and discussed, because both $v(t)$ and $B(t)$ are possible in principle. It is added that in both cases mechanically moving, as a rule rotating, designs but just as well resting designs are conceivable, in which only the moving charge carriers themselves realize the component of velocity v.

This time the crucial point is, that in both cases equally a change of the electric field strength E(t) is produced, with the help of which neutrinos should be collected. Because of the extremely high oscillation frequency of the neutrinos large field changes dE(t)/dt and associated with that large changes of tension voltage dU/dt seem to be the optimal solution, which can be handled with today's technology. Apart from that further difficulties are added, which require a managing in accordance with engineering. If we namely work with a large acceleration dv(t)/dt, then the inertia of the accelerated masses should be overcome, then only very small and light projectiles can be launched like in the case of the railgun. If we however work with fast changes of the magnetic field dB(t)/dt, then the inductance acts slowing down.

A: Suggestion from the patent specification of John W. Ecklin



B: For instance the „Stationary Armature Generator"

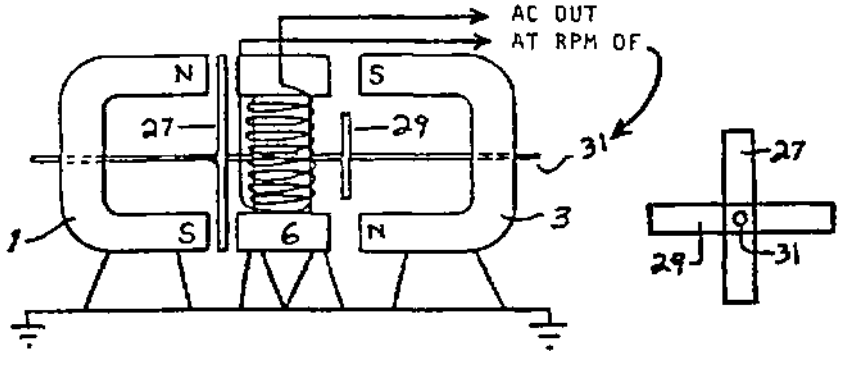


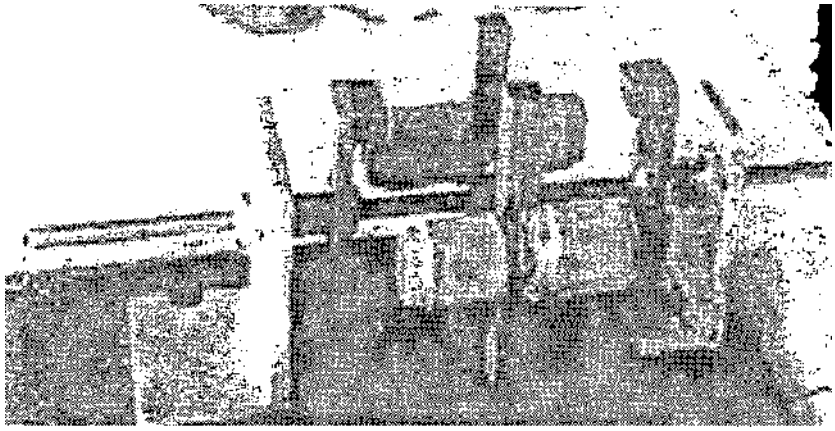
Fig. 16.3: Principle of the Ecklin generator.<i>

<i>: A. Schneider: Generatoren mit Ferritkernumpolung, NET-Journal 6/98, S. 9
Ecklin: Permanent Magnet Motion Conversion Device, U.S.Pat. 3'879,622

16.3 SET-devices with rotating magnetic fields

If we again come to speak of the Faraday generator, which can be built up in two variants. In the case of the F-machine the magnets rest and only the disc rotates, whereas in the case of the N-machine the magnets rotate along. In this case can't be avoided that some of the induced charge carriers roam about in the magnets and sensitively disturb the structure of the material. One only thinks of the bending spoon effect!
The consequences stretch from a loss of the permanent magnetism, over a shattering and bursting up to a pulverizing of the magnets. Adventurous rumours and alarming reports in this direction are sufficiently available.
An improvement could be obtained by an isolation layer between the conductive disc and the magnets, but against induced charge carriers inside the rotating magnets this measure is not able to achieve anything.
Anyhow the best thing to do will be to completely do without permanent magnets in neutrino converters! If we replace them at least in our minds by electromagnets, then a feeding with alternating voltage is possible. That also is necessary if oscillating neutrinos and not air ions should be collected.
As a result of the alternating voltage at first large eddy currents occur in the disc. The losses can be reduced by radial slits in the disc. The induced currents then only can, as wanted. flow radially to the outside.
Bigger headaches causes us on the other hand the inductive and with that current storing effect of the excitation coils. If a too large excitation inductance should prevent a fast increcase in current, then also the induced electric field will increase correspondingly comfortable and hardly be able to persuade a single neutrino to stay.
A coil core of iron or dynamo sheet metal with that is ruled out from the start. Even ferrite would be suitable at most conditionally. Usable are air coils with as possible as few turns.
In an advantageous design the slit copper disc rotates between two air coils, if need be flat coils built in the way Tesla did, which are fed with pulsed tension voltage.
The highest speed of change in current surely is obtainable by means of a spark gap, like already Tesla has used (fig. 9.1). But also other techniques are thinkable as pulse driving. For instance semiconductor power amplifiers with MOS transistors not only can be switched fast and hard, but in addition frequency and duty cycle can be adjusted freely with reproducible exactness. These are niceties, which will gain importance in connection with the control and regulation of a converter.

Und the heading "generators with magnetic flux variation" Mr Adolf Schneider has collected and commented on some concepts<i>. The generator of the american research scientist John W. Ecklin registered for patent at 22-4-1975 thus stands as an example of a whole group of inventions, in which the magnetic conductivity in the magnetic circuit and with that the flux is changed with a jump.
Fig. 16.3 B shows a building form consisting of two horseshoe magnets (1, 3) with a likewise resting coil in between (6). In rest the magnetic circuit experiences no change and consequently no tension voltage is induced in the coil. The trick is that an axis (31) is pinned right through the arrangement which is turned with two soft iron anchors, which magnetically short-circuit alternating the left (27) and the right (29) horseshoe magnets.



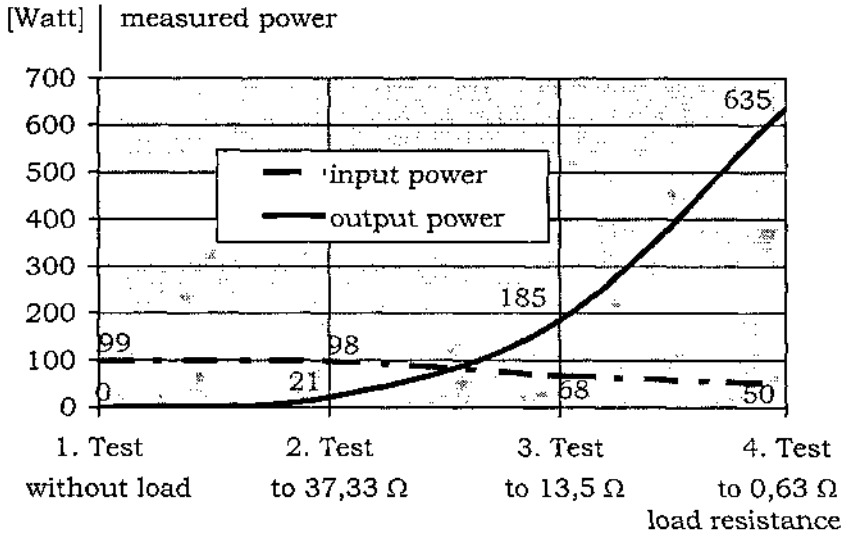


Fig. 16.4: Bedini magnetic converter.[<i>]

<i>: A. Schneider: Generatoren mit Ferritkernumpolung, NET-Journal 6/98, S.10

Besides the moment of reluctance, which should be compensated by the physical principle, and the friction of the bearing actually no further moment of reaction can occur which would have to be gotten over, not even then if current is taken out of the coil. If the flux change is large enough, purely arithmetically it should be possible to take off an electric power which is considerably larger than the friction power. John Bedini has 1985 measured an over-unity effect of up to 12.6 at a similar constructed generator, where with increasing strain also the factor could be increased (fig. 16.4).

16.4 Commentary concerning magnetic SET-devices

I judge these measurements rather sceptical, after I already in three cases had to break the message gently to the inventors, that their device unfortunately was nothing but an energy destroying machine and they merely had measured wrong, where admittedly the measuring of pulsed tension voltages and currents is not quite simple. So that you don't become a victim of wrong hopes and self-deception, I recommend all SET inventors to realize the closed-loop. If in the continuous operation power can be taken out of such an arrangement without supply of energy from the outside, and be it as small as possible, then that convinces everyone even any journalist and any non-expert.
Unfortunately in the case of numerous concepts at this place already the end is reached. As charming the variation of the magnetic circuit may be, in most cases I miss the unipolar arrangement of the fields. Perhaps here no neutrinos are needed at all and energy merely is withdrawn from the environment heat? I'm not able to answer this question and I surely don't need to, as long as no magnetic converter is demonstrated to me as closed-loop. such a converter, if it can be realized, presumably will at least partly hide one of its poles and produce some open field lines; that at least would be expected.

a still bigger measuring technical problem represent the neutrinos bound to a line, which oscillate around the conductor in the form of ring-like vortices. We have become acquainted with these in the case of the single-wire transmission technique of Tesla (fig. 9.5). They are formed, if neutrinos are slowed down and collected, but not yet have materialized to charge carriers. Tesla did use them for his loss-free energy transmission technology, but he couldn't supersede the alternating current technology full of losses, which also stemmed from him but which he called the worse technology, from the market because there were no power meters available for the single-wire-technology.

Today we still aren't one step further. The energy supply enterprises still decline this technology, as I had to learn myself, although this would be the only way to transport solar energy from the desert or energy from the geothermal energy of Iceland by a sea cable to Central Europe, where it is needed.
Today still no gauges exist for such neutrinos bound to a line. Therefore will every measuring technician experience his Waterloo at SET-devices, in which they occur! I now will report of such a converter and the odd measuring problems.

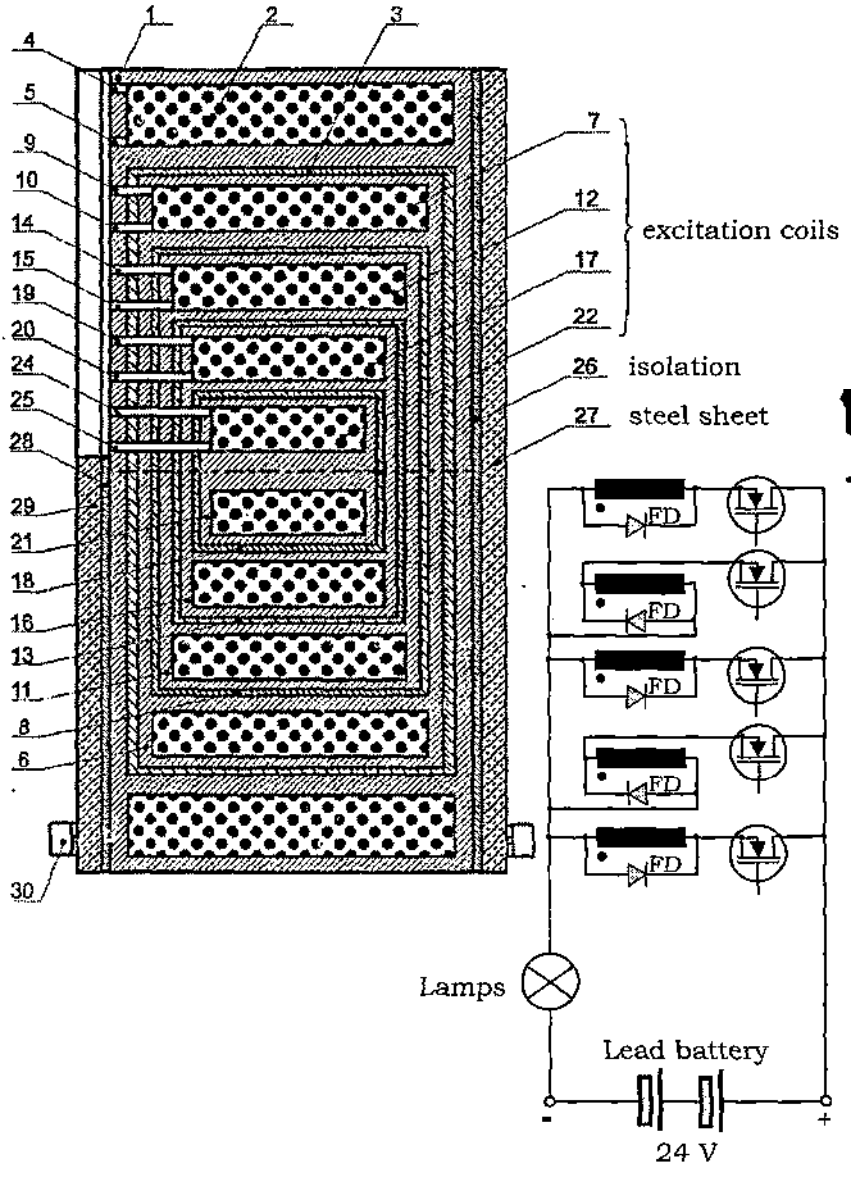


Fig. 16.5: Space quanta manipulator of the Firma ROM AG<i>

<i>: Gibas, Greilinger, Lehner, Rusterholz: Strom aus dem All, Mega Link, Fachzeitschrift fur Elektronik, Nr. 6, Marz 1998, S. 18-23 resp. Bau: Glaube kann Berge versetzen, Bulletin SEV/VSE 25/97, S. 31

16.5 RQM and the space quanta manipulator

If an employee or one of the numerous shareholders of the Swiss Firma RQM AG in Rapperswil speaks of space quanta, then he with that presumably means the neutrinos. An oscillating source of neutrinos is called central Space Oscillator and an operation in resonance of the energy receiver, the so-called space quanta manipulator, is required.
Mr Ludwig Sigrist, the creator of this world of imagination, was not a physicist but crane operator (pseudonym Crane O.) and inventor, whom textbook physics couldn't help further in his considerations anyhow. His concept, if it can be translated into a scientific comprehensible language or not, at least helped him personally and gave him the position to create the space quanta manipulator (fig. 16.5).

It consists of several pot coil systems, which are build up and boxed into each other according to the Matrjoschka principle of scaling down. The ferromagnetic core material of the pot spheres (1, 6, 11, 16, 21) should show magnetostrictive properties as distinct as possible. As we will see, this measure gains its actual importance first in connexion with the interaction with neutrinos!

Each pot sphere carries an excitation winding (2, 7, 12, 17, 22), through which alternatively flows a current in opposite direction. By means of this measure, which seems useless according to classic design concepts, one of both field poles is pinned in the centre, in which way the necessary open field lines are produced.

The individual pot spheres are insulated from each other, where the isolation layers (3, 8, 13, 18, 26, 28) should have a high dielectricity. The pot spheres thus in addition form capacitors with each other; even the ending plates at both sides (27, 29) function as capacitor plates.
This construction, the core piece of the planned RQM converter, is driven by a transistorised power amplifier with excitation impulses as steeply flanked as possible. According to patent specification<i> the pulse widths are freely eligible in steps of 5 ns betweeen 200 nanoseconds and one second. Besides the frequency also the polarity and DC voltage offset are adjustable.

Every visit of the laboratory leaves a lasting impression: Carefully the engineers grope forward, turn at the frequency and the duty cycle, until the effect suddenly occurs and neutrinos, the space quanta, are being collected. One realizes that tuning parameters with still stronger reactions would be possible, but entirely without any regulation and limitation of power that can't be controlled anymore. The avalanche effect would destroy everything, and so one is further dangling along the brink of the abyss in the development laboratory of the RQM, all the time trying hard to gain control of the hardly understood effect.
Concerning the setup and the mode of operation of the pot system the inventor did let his posterity have explanations, but why a diode in free operation FD suddenly loses its rectifying function, for that neither the employees nor specialist visitors of as high as possible scientific rank in the laboratory until now had ready an answer.

<i>: Gibas, Lehner, Greilinger: Vorrichtung und Verfahren zur Erzeugung elektromagnetischer Pulse, Patentschrift CH 687 428 A5 vom 7.5.1996

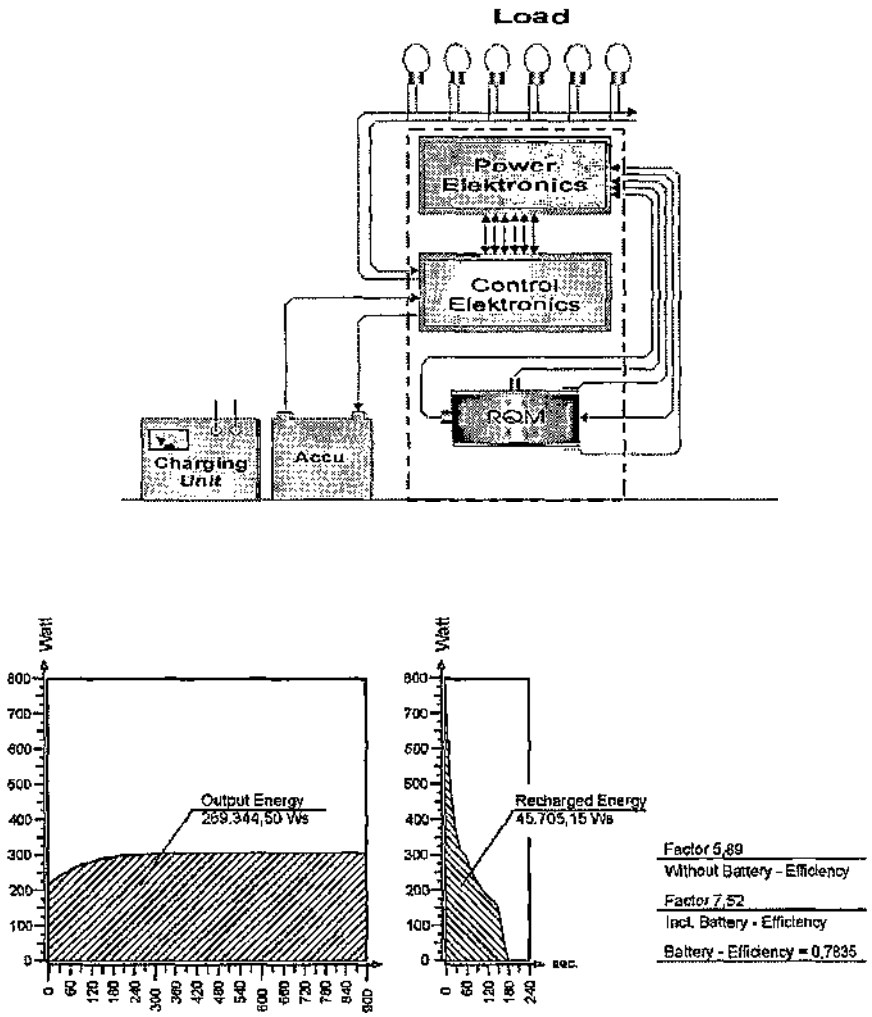


Fig. 16.6: The RQM test installation of 23-9-1996<i>

<i>: F. Greilinger: Der Weg zur erfolgreichen, stabilen Energieauskopplung, RQF Magnetik, Sonderausgabe 1996, page 10

As said, the neutrinos no longer are free but bound to a line, if they leave the pot system. They oscillate around the wire, even around every semiconductor and rove through the entire switchboard. Doing so they can cause quite something, also bring about quite some disaster.
Lead batteries are being recharged, which without doubt is desirable, but in the continuous operation they are destroyed by the same vagabonds. In normal light bulbs for instance some of them materialize to charge carriers, so that according to a gauge more current leaves the light bulb, as on the other side flows in to it. It indeed glows completely normal, but measuring technical for the installation nothing is normal anymore.
The visitor can be shown by means of a high precision measuring facility of vibrations that the pot coils oscillate not only electrically and magnetically, but also mechanically. But the effects alone don't make a converter, which can be produced and which await already numerous buyers of options and licenses.
On the one hand measures for the purposeful conversion of the roving space quanta in utilizable charge carriers here still are missing. On the other hand any controlling facility is missing, to adapt the power taken up from the neutrino field to the momentary need of the consumers. The brave engineers of the RQM still have quite some way in front of them. but the line of approach is right and the reached can be looked at.

16.6 SET-devices with pulsed magnetic fields

In the case of the space quanta manipulator mechanically nothing is moving. In the copper coils the charge carriers merely are on the way with the velocity v. We here have present a typical example of a SET-system with pulsed magnetic field. Compared to the before discussed SET-devices with rotating magnets, for instance the N-machine, the space quanta manipulator clearly has its nose in front. Without brushes, without friction and wear and tear it theoretically has a unlimited life.
In addition it is simpler to produce the necessary large steepness of the flanks in an electronic way as by a mechanical variation of the magnetic field. By means of electronically driving the process it also can be checked, controlled and regulated easier.

The question for an optimisation of the concept still remains. At present one already can be satisfied with a study of possibility, but sometimes one will question the design. There as an example the eddy current losses in the iron pots will be at discussion. About sheeted or sintered materials could be thought, if not at the same time the inductance of the coil would increase in that way, which slows down the increase in current. Ferrite materials again are very brittle and would crumble to dust under the mechanical oscillations of size. I proceed from the assumption, that also here an arrangement with air coils could turn out to be an optimum. It does make sense, if Tesla at higher frequencies always did experiment with air coils.
Now it still depends on the coiling technique. One single conductor loop doesn't provide any open field line. For this purpose if need be two loops have to be supplied with current in opposite direction, like it is the case for a so-called Mobius winding. In this way possibly just as many neutrinos interact as in the case of the pot coils of the space quanta manipulator, which are alternatively supplied with oppositely phased current. To clarify the situation we now should occupy us with the coiling technique.

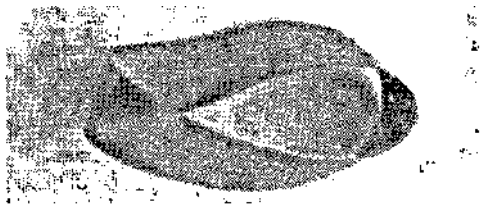


Fig. 16.7 A: The Mobius band

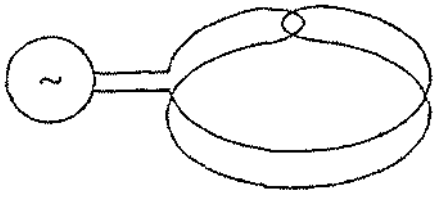


Fig. 16.7 B: The Mobius strip

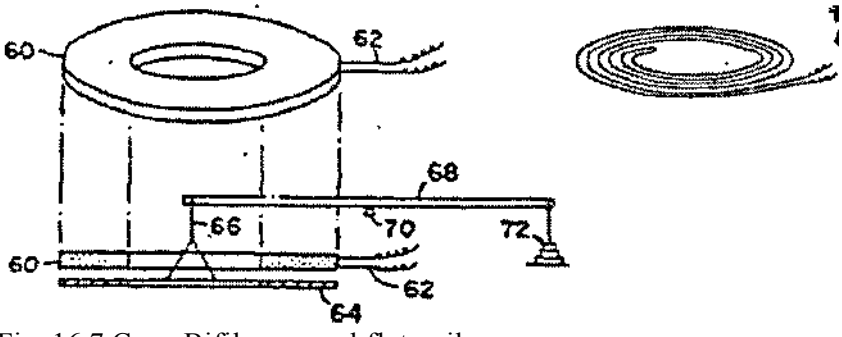


Fig. 16.7 C: Bifilar wound flat coil

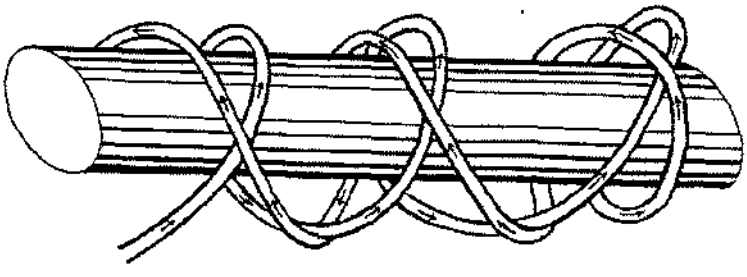


Fig. 16.7 D: Mobius winding arranged like a cross

16.7 SET-devices with Mobius winding

In connection with space energy devices often is talked about the use of a Mobius winding. That is traced back to the Mobius band, which one obtains, if one for example one end of a long paper strip after a half turn glues together with the other end. The result is a strip, which has neither top side nor underside and neither right nor left border. This object with only one side and only one border is a creation of the German mathematician August Ferdinand Mobius (1790 - 1868), fig. 16.7 A.

A distant relative of the Mobius band is the strip with the same name, where the magnetic field lines mutually cancel out. It is the same compensation, as we know of a two core electric cable, where the supply and return cable are run close together. For that the sense of winiding of a conductor loop simply is reversed (fig. 16.7 B).
If the magnetic field vector is wrapped right-handed around the supply cable and left-handed around the return cable, then both amount to zero, so that measuring technical no rest field can be detected anymore at some distance.
THE pointer of the electric field stands perpendicular to the magnetic field vector and points in the direction of the conductor and the movement of the charge carriers. From the coupling of magnetic and electric field follows, that the compensation of one of them also leads to the compensation of the other one. But if the electric field actually is compensated, then there may not flow any current in the winding!
There however flows a current if an electric tension voltage is supplied to the Mobius winding. As a result of this forced current flow both electric and magnetic fields have to occur, which are not compensated! Some field lines will fold outward the expected direction and stand in space as open field lines. These we, in the oscillating case, owe the interaction with the neutrinos.

A perfect compensation would be expected for a two core, bifilar winding. The American physicist William Hooper was able to obtain interesting effects with a bifilar wound flat coil. With help of a balance he could detect attracting or repelling force effects on different, electrically or magnetically neutral discs (fig. 16.7 C)<i>.
But he feeds the flat coil with direct current, so that a contribution of neutrinos can't be expected. Such effects only will occur, if one works with pulsed signals, because the bifilar wound flat coil quite obviously is able to form wanted, open field lines.

<i>: Schneider, Adolf: Energien aus dem Kosmos, Jupiter-Verlag 1994, page 28, taken out of:

Mielordt, Sven: Tachyonenenergie, Hyperenergie, Antigravitation, kaum & Zeit Verlag 1984

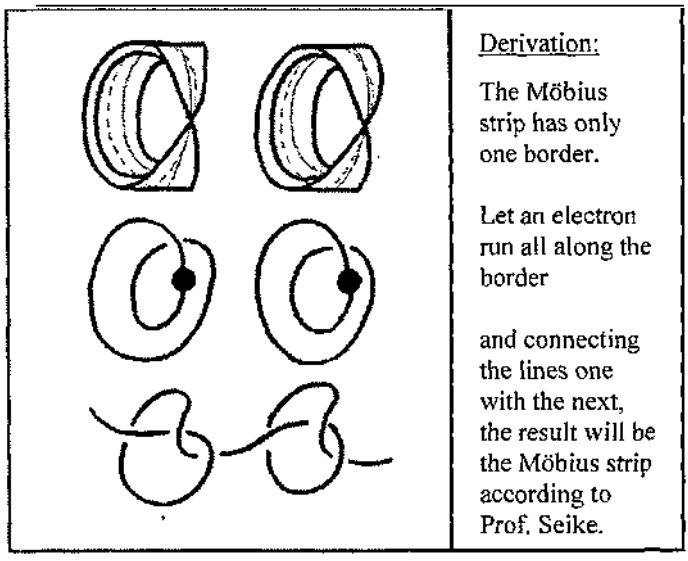

Derivation:
The Möbius strip has only one border.
Let an electron run all along the border
and connecting the lines one with the next, the result will be the Möbius strip according to Prof. Seike.

Fig. 16.8 A: Derivation of the Mobius strip acc. to Seike<i>

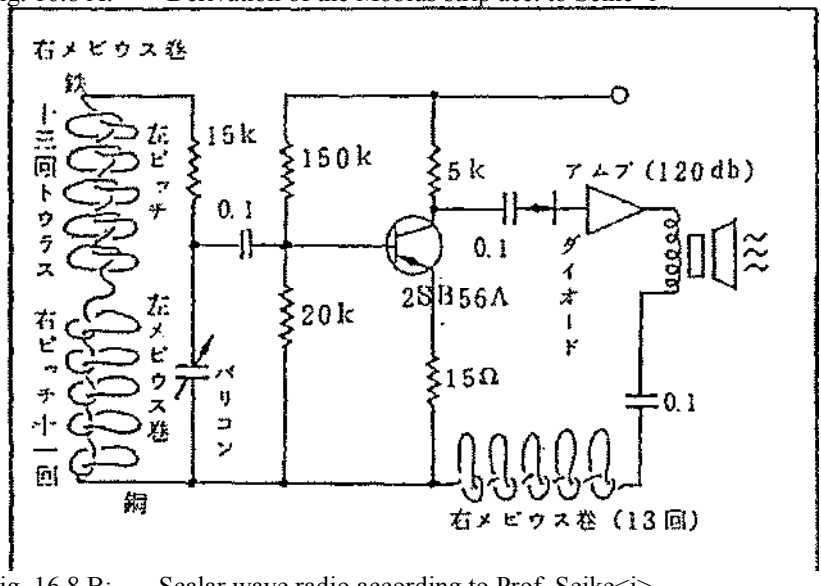


Fig. 16.8 B: Scalar wave radio according to Prof. Seike<i>

<i>: Seike, Shinchi: The Principles of Ultra Relativity, Space Research Institute 1990, ISBN 915517-1

16.8 Mobius converter of Seike and Coler

Concerning construction it can be an advantage to wind a Mobius coil not purely bifilar and in that way to do without a perfect compensation. It often already is sufficient, if two conductors cross and only individual components of the field vectors partly cancel out. In the case of the coil, which is pulled apart and wound like a cross, drawn in fig. 16.7 D the conductor current and the fields of supply and return cable belonging to it stand under an angle of almost 90°. This in individual cases should already be able to cause the formation of open field lines.

Similar field conditions are formed, if after every turn the wire is looped under the last winding. At the knots again the angle conditions of approx. 90° occur. The Japanese professor Shinichi Seike preferably works with this kind of winding, which he directly derives from the Mobius band (fig. 16.8 A)[<i>]. He has designed an electro-gravitation motor basing on this principle. He also speaks of weight reduction and of an artificial anti-gravity field. It could be confirmed experimentally, that his setup cooled down slowly during the operational tests, despite the expected heating up by the copper losses of the current[<ii, S.29>]. Unfortunately I don't known anything more exact.
In his book further is found the wiring diagram of a radio for the reception of scalar waves (fig. 16.8 B). He thereby quite simply replaces all coils in the high-frequency part with his Mobius coils. If longitudinal waves already are measurable and receivable with this simple measure, first has to be checked.

The German captain Coler more than 50 years ago has developed another Mobius converter. His "Magnetstromapparat", with approximately 6 kW power and an at least four-fold over-unity effect uses six coils with permanent magnetic core. As a peculiarity he in addition runs the coil current through the core under an angle of 90° with regard to the coil current (fig. 16.8 C).

More detailed details can be seen in the footnote[<ii, S. 22>].

<ii>: Adolf Schneider: Energien aus dem Kosmos, Jupiter-Verlag 1994

S.22: "Scientists of the Technical University Charlottenburg in Berlin and Munich confirmed that the device functioned without objections, but they didn't find a theoretical explanation for the production of energy. The professors Kloss and Franke of the Technical University of Berlin found a degree of effectiveness of 450%. Prof. Schumann confirmed that 4.8 to 6.7 times more energy came out, than was put into the device. Prof. Schumann excluded a deception entirely as the records prove.
But it wasn't simple to set the device going and the stability for longer periods of time wasn't guaranteed. The war confusion set an end to further research. After the end of the war the British secret service confiscated all available documents and apparatus. Part of the report was declassified in 1962".

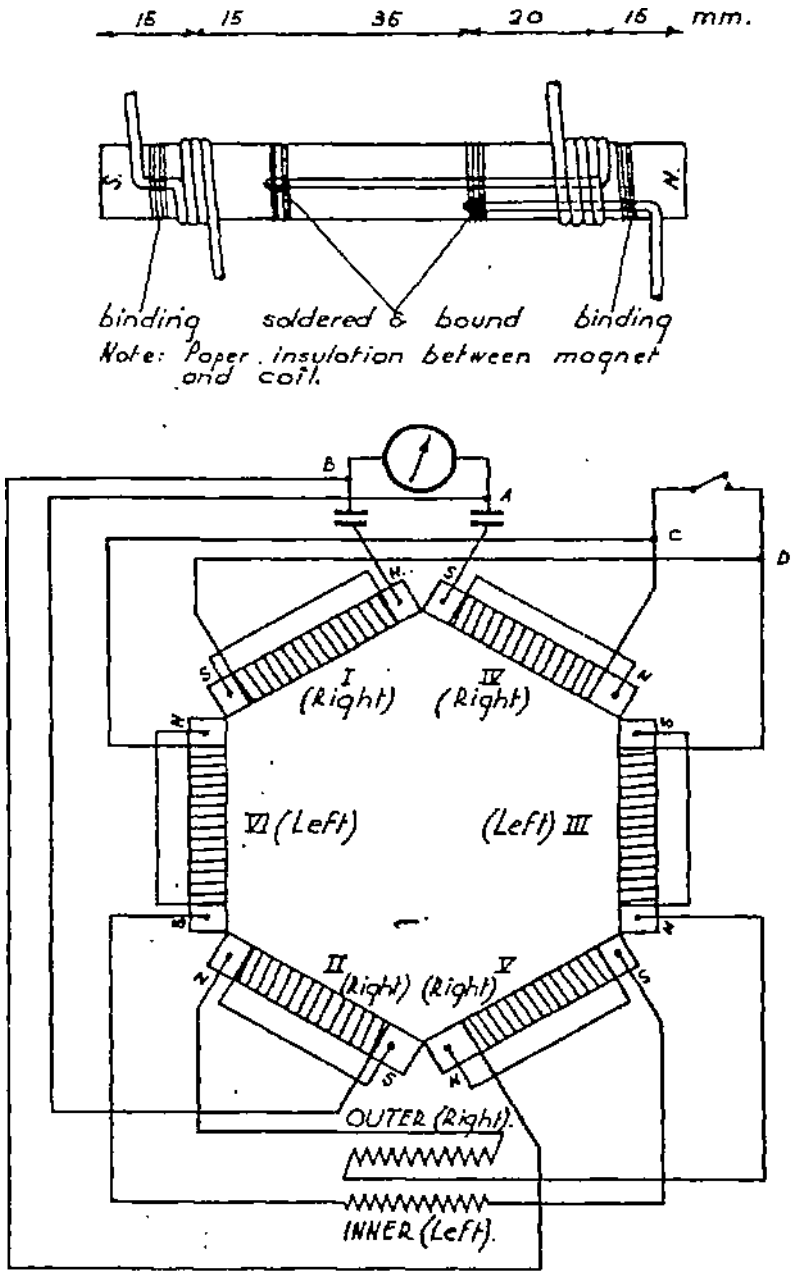


Fig. 16.8 C: The Coler converter

16.9 Tesla's flat coil

In the category of the unconventional coiling techniques without doubt the Tesla coil may not be missing. If in schools and high schools such coils were standing in the laboratory for teaching purposes, then as a rule it are cylindrical coils. In reality Tesla worked with flat coils but that, so is said, isn't necessary anymore today, since we have at our disposal better isolating materials than 100 years ago. Actually Tesla contended with problems of osilation, which he could solve with the help of the flat coil, but it should turn out that the coil geometry is attached a crucial importance.

Everything had started with Tesla having to leave the Technical Highschool in Graz without diploma. He ran out of money and he had dared to criticize the venerable Professor Poeschel and his sparking Gramm dynamo. With that he had put himself under compulsion to succeed. Two years later he had ready the solution. In the year 1882 he discovered the rotary field in Budapest.
In the time to come he designs and builds an alternating current motor, but no-one wants to have it and surely Thomas Alva Edison not. Tesla after this disagreement very fast gives up his job at the Edison Company again and again stands under pressure to succeed. With that the eternal bachelor Tesla urges himself to ever higher efforts. He wants to prove himself and the rest of the world that his alternating current system is superior to the direct current system.
Direct current, as is well-known, can't be transformed, and thus the advantage of Teslas alternating current lies in the possibility of power transport by high-tension cable over large distances. But for that the high-tension transformers first had to be developed and thereby the said problems of isolation occurred.
With each turn the tension voltage at the transformer winding increases. The distance to the grounding point lying on the outside has to be chosen bigger with each turn, so that no blow inside of the high-tension winding occurs. A consistent solution of the problem in accordance with engineering is the flat coil used by Tesla, wound spirally from the inside to the outside (fig. 16.9 A)[<i>].

It thus is correct that isolation technical reasons led to the flat coil, since Tesla himself was completely surprised as he had to find out that this coil can lose its self-induction, that scalar waves can be detected with it and that it is cooled down during operation in an inexplicable manner.

This cooling effect Tesla has investigated more detailed and after all even used. In his patent specification concerning the superconductivity he describes, that the flat coil also loses its Ohmic resistance, if he in addition previously cools it with liquid air. The remaining cooling down to absolute zero his flat coil obviously has carried out entirely by itself with help of the neutrinos (fig. 16.9 B)[<ii>].

<i>: Nikola Tesla: Coil for Electro-Magnets, Patent No. 512,340 (1894)

<ii>: Nikola Tesla: Means for Increasing the Intensity of Electrical Oscillations, Patent No. 685,012 (1901)

singly wound flat coil (Tesla coil)

bifilar wound flat coil (from the patent specification of Tesla)

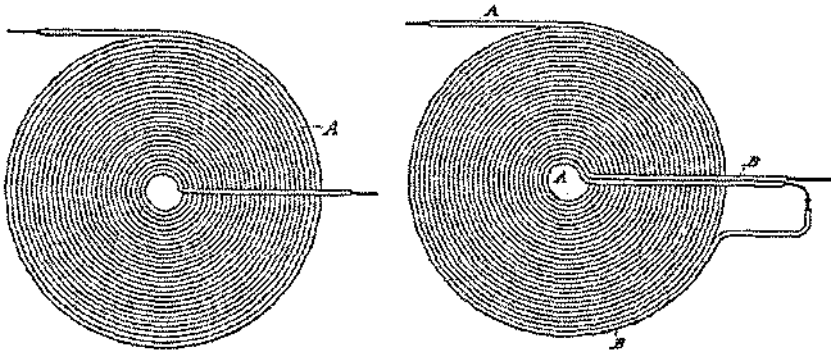


Fig. 16.9 A: Coiling techniques of Tesla's flat coil.[i]

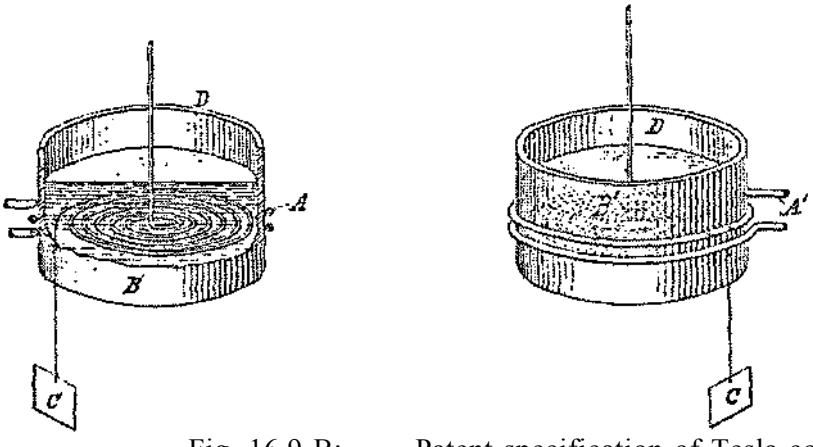


Fig. 16.9 B: Patent specification of Tesla concerning Superconductivity.[ii]

<i>: Nikola Tesla: Coil for Electro-Magnets, Patent No. 512,340 (1894)

<ii>: Nikola Tesla: Means for Increasing the Intensity of Electrical Oscillations, Patent No. 685,012 (1901)

16.10 The secret of the flat coil

The technical function could be explained in the way that the charge carriers of a flat coil by induction are set into motion for excitation from the outside. The transmitted energy shows in form of kinetic energy. The spiral flat coil becomes narrower and narrower towards the inside, the length of each winding shorter and shorter, so that the kinetic energy inevitable has to decrease in favour of a rotational energy. The faster and faster rotating spherical vortices are pulled apart to flat discs and eventually to ring-like vortices by the centrifugal force. The electrons at first become neutrinos bound to a line and finally free neutrinos. Tesla has technically used the first ones in the single-wire-transmission technique (fig. 9.5) and the last ones in his wireless energy transmission (fig. 9.7).

Like many other inventors, Tesla owes also the inventions, which he counts his greatest, like the radio technique and the Magnifying Transmitter, first of all his industriousness. his persistence and a great deal of inventor luck. A magician, as he is called in his most important biography, he by no means was<i>. The flat coil, to which led him chance and which plays a central role in all these inventions, gave him the lucky position, to collect neutrinos and materialize them to charge carriers or in reversed direction to dematerialise electrons to neutrinos.

The technology however is everything else but new. Already the Lituus of the Etruscan and Roman Augurs and the crook of the priests had the same spiral structure (fig. 16.10). In the case of the devices, which the Augurs for instance served at land surveying, it clearly concerns flat coils according to Tesla. We will go into this strange „gauge" more in detail in part 3 of the book<ii>.

The trick probably is, that one component of the electric field pointer is directed towards the centre of the coil and as a result some open field lines are generated, which then collect neutrinos from space.
In this process the neutrinos thanks to the resonant interaction are slowed down to the speed of light and following, as discussed, materialized by means of the flat coil, as in addition rotational energy is withdrawn from the neutrinos. Since the receiver oscillates resonant with opposite phase, in addition the thermal oscillations are reduced and the receiver becomes cold!

If one compares the Mobius coil with the Tesla coil, then besides numerous properties in common the strength of the first coil lies in the production of open field lines and the collection of neutrinos, whereas the special and additional property of the flat coil lies in the materialization, in the conversion of neutrinos into charge carriers. But the advantages of the flat coil have to be bought at the expense of having to work with very high tension voltages (above 511 kV) and with large changes in tension voltage (du/dt). With this set of difficulties we will have to deal in more detail.

<i>: Margaret Cheney. Nikola Tesla, Erfinder, Magier, Prophet (Orig.: Man Out Of Time, 1981), Omega-Verlag Diisseldorf 1995

<ii>: K. Meyl: Electromagnetic environmental compatibility, part 3, edition belonging to the information technical seminar, INDEL Verlagsabteilung 2003.

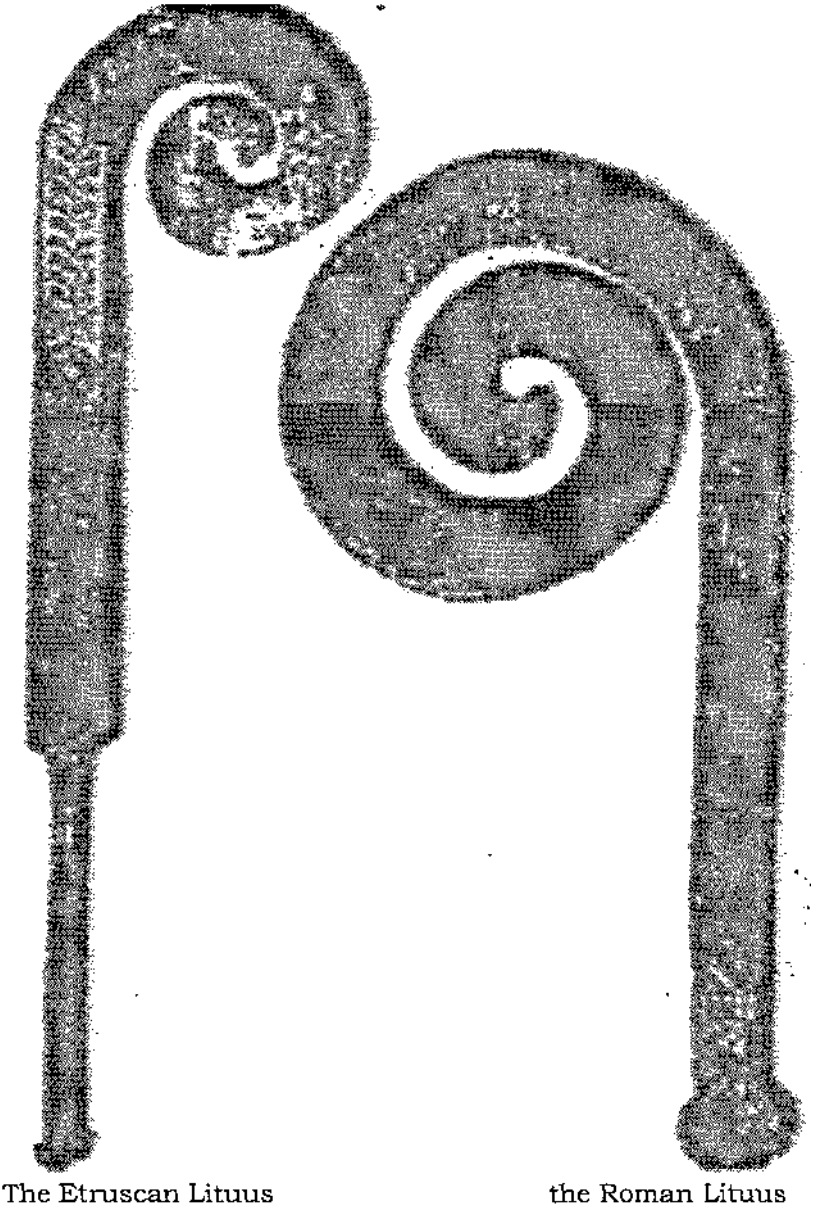


Fig. 16.10: The Lituus or crook of the Augurs in ancient Rome

16.11 Discussion concerning the technology of the neutrino collectors

Let us again collect the facts for the discussion: A SET-device is distinguished by a more or less unipolar design and open field lines, with which interact neutrinos, which are oscillating in resonance. These then are slowed down and collected. For the transient process a large change in tension voltage (dE/dt) is required, which can be obtained directly, for instance by means of a spark gap, or indirectly by means of Faraday's law concerning the unipolar induction (E = v x B).
The discussed possibilities concern the acceleration of a machine part (dv/dt), the variation of the magnetic field (dB/dt) by pulse-like excitation signals (16.5) or by magnetic flux variation (16.3) and the railgun. which even can be operated without foreign magnetic field (fig. 15.5 C) and for which in that case occur both a dv/dt and at the same time a dB/dt.
For resting arrangements the velocity v is that of the charge carriers moving in the conductor. So that Faraday's law thereby doesn't lose its influence, the pointers of E and v mustn't point in the same direction, as in the case of "normal" coils. Unconventional windings, which for instance can be knotted like Mobius strips (16.7), take remedial action. Also the ancient crook, rediscovered as flat coil of Tesla (fig. 16.10), proves to be suitable in principle. Here one component of the electric field pointer points in the direction of the centre so that the wanted, at least partly, unipolar arrangement can be formed.

The first step, the collecting of space quanta, shouldn't pose an insurmountable obstacle anymore in view of the numerous possibilities and the detailed explanations. A real difficulty we still have before us, because in most cases some ring-like vortices bound to a line are formed, for which no electronic construction element exists and for which functioning converters hardly are known.
There spoons are bending, some lumps are flying through space, radioactivity is disappearing without a trace, light phenomena are formed and the device suddenly is becoming cold. Almost all inventors, who have arrived in this place, are enthusiastic about the not understood effects or with that are wanting to get attention, but hardly anyone really starts something with that. Until now the necessary system and an useful theory were missing.

Only too often isn't considered, that only an indirect conversion into charge carriers is possible, that during the materialization of neutrinos a intermediate product is formed, which can be described with the model concept of a neutrino bound to a line or of an oscillating ring-like vortex. The technologies collected in this chapter concerning the collecting of neutrinos only form the first step from the free to the bound ring-like vortex. The coming chapter is dedicated to the second step. Here we should try to understand the properties of space quanta bound to a line and loudly think about for which purpose we could use them in practice<i>.

<i>: Reference: Both chapter 16 and chapter 17 treat point 4 according to table 15.1 concerning the resonant interaction (page 86).

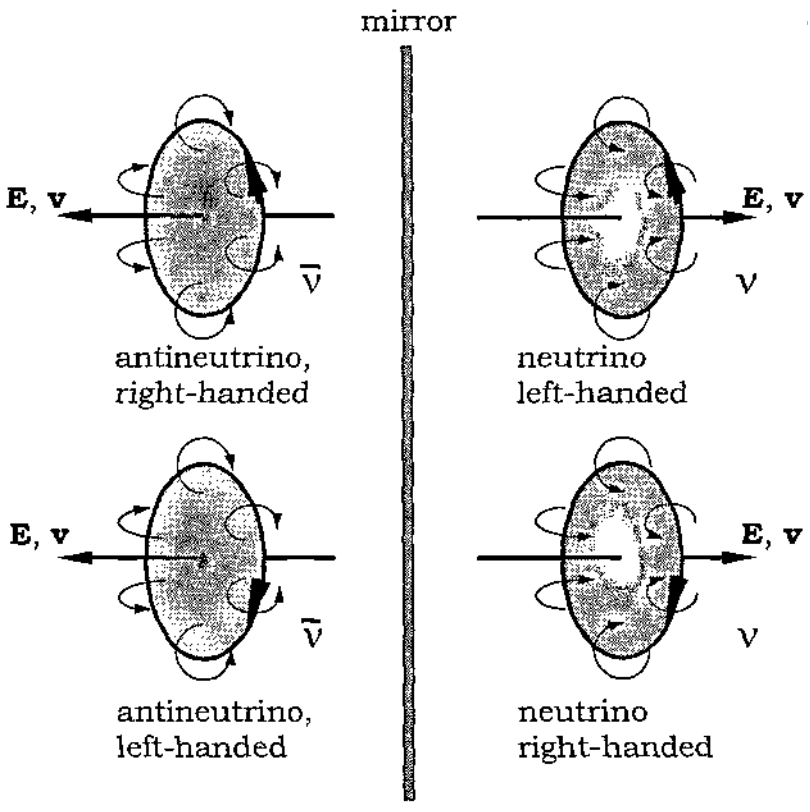


Fig. 17.1: _____Application of the mirror transformation to the neutrinos

---

<i>: Kleine Enzyklopadie Atom, Verlag Chemie GmbH, Weinheim 1970, S. 119:
„For the neutrinos the quantum number parity isn't defined, because they have a fixed association of the direction of momentum and spin; the sense of rotation of the spin and the direction of momentum in their case form a left-hand wound screw, in the case of antineutrinos a right-hand wound screw. By the shown mirroring the direction of momentum is reversed, but the sense of rotation remains unchanged; i.e. reactions, in which neutrinos occur, are not mirror invariant, they violate the law of conservation of parity". (translated)

Note of the author:, an antineutrino by no means can be assigned to the anti-matter, since it exactly like every neutrino alternatingly takes the matter state and the anti-matter state, by oscillating around itself (see fig. 7.12). The description merely follows a definition founded in usefulness.

17. Technical use of the weak interaction

17.1 Radioactivity caused by neutrinos

Neutrinos are standing in a weak interaction with other elementary particles. This circumstance is known in general. According to the considerations and derivations expressed in the book the neutrinos mediate the resonant interaction, what leads to the conclusion, that the weak interaction represents a partial aspect of the resonant interaction, in which case it merely concerns the proximity.
Efforts are further being undertaken, to combine the weak interaction with the electromagnetic to an electroweak interaction, after it was remarked that a certain coupling constant corresponds in both cases. We of course aren't surprised, because the electromagnetic interaction anyhow describes only the special case of the resonant interaction with the frequency zero.
The weak interaction concerns with the very small range of just 10^{-16} meters only the proximity of the neutrinos, for instance the ß-decay, where the neutrinos for the reason of their oscillating charge a free neutron rattle and shake so long, until it eventually decays. on the average after approximately a quarter of an hour.

The Austrian physicist Wolfgang Pauli had remarked, that half the decay energy after a beta-decay is missing and the balance sheet of energy isn't working out. In addition also the balance sheet of angular momentum isn't working out, because the nuclear spin is being changed for a whole unit. Pauli as a result 1930 has introduced a hypothetical particle without mass and without charge, which he called neutrino.
With that Pauli and his co-working Italian colleague Fermi it is true are the givers of the name of the neutrinos, but not by all means the discoverer. If Cowan and Reines l956 have detected these particles with large expenditure of devices, then also that by no means was a premiere, as falsely can be read in textbooks and encyclopaedias. After all Nikola Tesla already decades ago had demonstrated, that the neutrino radiation not only exists, but even can be used energy technically.

Now the radioactive decay a ß-radiation occurs, triggered by the conversion of neutrons in protons or vice versa. This obviously takes place under the influence and participation of neutrinos in the atomic nucleus. The ß-radiation to a special extent consisting of electrons and positrons, as it occurs in the case of nuclear fission, is quite unhealthy and by no means ecologically compatible. Under the influence of free charge carriers not only metal lattices become soft and spoons can be bent, but also an electrolysis takes place, where the water molecules are splitted into their parts. That isn't a good prerequisite for the flora and fauna on our planet, which predominantly is built up of water structures.

Fig. 17.2: Einstein, Tesla and Steinmetz[<i>] (from left to right)

<i>: Franz Ferzak: Nikola Tesla, Eigenverlag, S. 103

17.2 Nikola Tesla, the discoverer of the neutrino radiation

The discoverer of the neutrino radiation himself will best be able to explain the connexion. In the New York Times Tesla writes, that he has discovered and investigated the phenomenon of the cosmic radiation, long before others started their researches[i]:
"According to my theory a radioactive body is only a target, which constantly is being bombarded by infinitely small balls (neutrinos), which are projected from all parts of the universe. If this, at present unknown, cosmic radiation could be interrupted completely, then no radioactivity would exist any longer.
I made some progress regarding the solution of the mystery, until I in the year 1898 attained mathematical and experimental evidence, that the sun and similar celestial bodies emit energy-rich radiation, which consist of inconceivable small particles and have velocities, which are considerable faster than the speed of light. The ability of penetration of this radiation is so large, that it penetrates thousands of kilometres of solid matter, without their velocity being reduced noticeably. "
It must be admired how Tesla guided by experimental observations and a reliable instinct comes to the correct result. He merely with the conclusion, because of the missing interaction the neutrinos have to be inconceivably small, isn't quite right. Their size rather depends on the velocity, because the overfast neutrinos are being length contracted stronger. Tesla however hits the nail exactly on the head, if he on the occasion of the press conference for his 81st birthday declares, the radioactivity is a clear proof of the existing of an outer radiation of cosmic origin[ii]. „ If Radium could be shielded against this radiation in an effective way", Tesla writes in an essay of 1934, ,,then it wouldn't be radioactive anymore". At this occasion he contradicts Albert Einstein, without thereby pronouncing the name and is indignant at the wrong working method of the scientists[iii].

Me personally fascinates, how here until now ignored results have been presented, which I first had to work out theoretically myself with difficulty. Tesla, to the best of my knowledge, hasn't taken theoretical derivations, at least none have been handed down. As a brilliant experimental physicist he must have reached his conception world by means of the measuring technique. The perfect correspondence of his experimentally determined and the by me theoretically won insights should be judged as evidence for the correctness of this view.

<i>: Dr. Tesla Writes of Various Phases of his Discovery, New York Times, Feb. 6, 1932, P. 16, col. 8

<ii>: Tesla Said (J.T. Ratzlaff), Tesla Book Company, ISBN 0-914119-00-1, P. 272

<iii>: "The scientists of today think profound instead of clear. One has to be mentally sane, to be able to think clear, but one can think profound and nevertheless be completely insane. The scientists of today have substituted experiments by mathematics, and they travel from one equation to another and eventually build up a construct, which has absolutely no relation to reality"...

taken from N. Tesla: Radio Power will Revolutionize the World, Modern Mechanics and Inventions, 7/1934, (Tesla Said, P. 264)

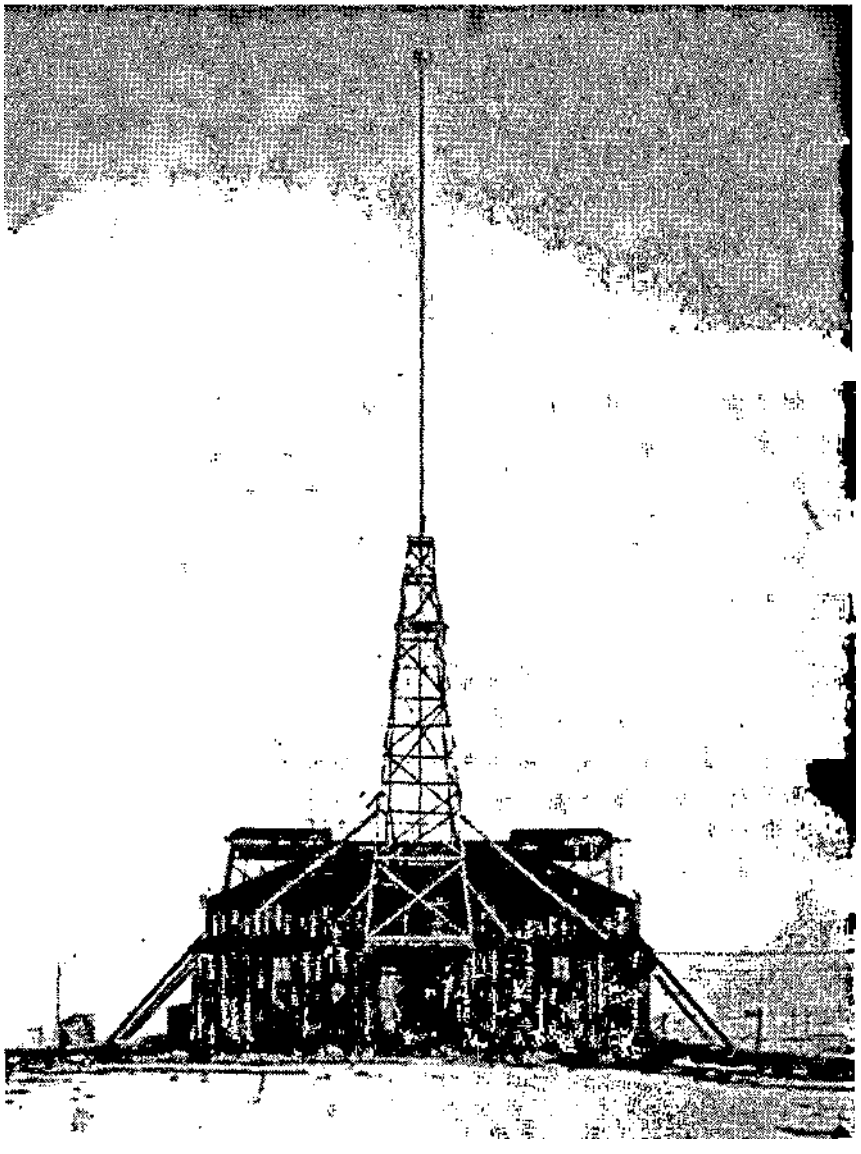


Fig. 17.3: The Magnifying Transmitter of Nikola Tesla Would the research station in Colorado Springs (1899 - 1900) have been suitable for transmutation?

17.3 Transmutation and reduction of radioactivity

If we are capable to collect and bundle up neutrinos, then should with that an influencing of the radioactive decay become possible, then also a decontamination of radioactively contaminated material and a so-called transmutation should be possible. We here have a concrete possibility before us, to use the produced ring-like vortices directly for the benefit of humanity. Dangerous transports with Castor containers, permanent and temporary storage and the contamination of whole areas by radiation, like around the nuclear power station Tschernobyl, which got out of control, wouldn't be necessary at all. If namely burned out fuel rods and objects contaminated by radiation have undergone a concentrated neutrino shower, then the radioactive decay takes place accelerated, so that the half-life can be drastically reduced. After the treatment the dangerous special waste would have been changed to harmless domestic rubbish. Even recycling or reuse are feasible.

The topic is at least as explosive as the energy question and as well completely unsolved. That's at different places and in some companies is already feverish researched about technologies concerning transmutation. Often it are the same people, who also work at the theme of space energy. The reason quite simple is that in both cases neutrinos have to be collected and bundled up. In the case of transmutation however the necessity of materialization can be dropped, so that the goal can be obtained faster and simpler. Consequentially is reported of more cases of a successful decontamination and of transmutation, than of functioning energy converters. Until now most techniques however still hardly are suitable for bringing into action technically on a large scale, but they carry clues of a solution of the problem already in them.
At the congress "New Energy technologies from USA" 6.12.1997 in Zurich I have lectured concerning the theme[<i>]: „Presumably as the first one the doctor Dr. Wilhelm Reich has carried out corresponding experiments with his „Orgon accumulator" (fig. 9.2). From him also stem warnings about biological effects, which should be taken serious, if radioactive material is put under his Orgon accumulator and the process of decay takes place accelerated".
If one dares an interpretation of his experiments with only 1 mg radium, then numerous charge carriers materialized at hitting upon his sample of the bundled up neutrino radiation with the consequence of high electrostatics in the environment, which Reich has called DOR-state (Deadly ORgone) (chap.15.11).

Another way would be the rebuilding of a neutrino transmitter according to the plans and patent specifications of the experimental physicist Nikola Tesla (fig. 9.11). He 100 years ago had realized a real neutrino-broadcasting and for that developed an unconventional switching technique. Tesla called his transmitter a „Magnifying Transmitter" (fig. 17.3). He choose the name „Magnifying Transmitter", after he had received more energy than he had transmitted in experiments and this effect moreover was increased with increasing distance to the transmitter. He obviously also had collected free and synchronously oscillating neutrinos, and that would be the best prerequisite for a successful transmutation and decontamination of radioactive material!

<i>: Konstantin Meyl: Die Wechselwirkung der Neutrinos; uber Massnahmen, die Halbwertszeit beim radioaktiven Zerfall herabzusetzen. NET-Journal Jg. Nr. 3, Jan./Feb. 1998, S. 14-20

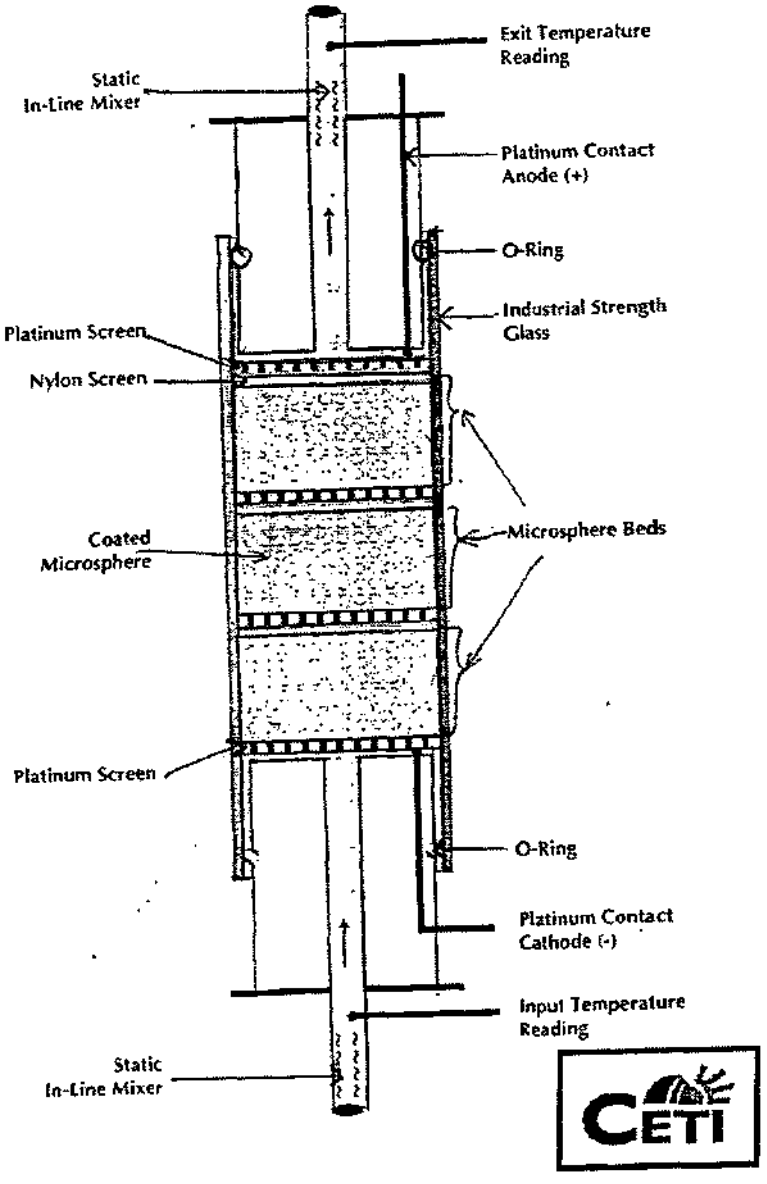


Fig. 17.4: 1 kW Patterson Power Cell.[<i>]

<i>: Patterson, J. A.: System with electrolytic cell and method for producing heat and reducing radioactivity of a radioactive material by electrolysis. US Patent No. 5.672.259 of Sept. 30, 1997, as reprinted in Infinite Energy, July-Nov.1997, pp. 13-16

17.4 The Patterson Power Cell

As an example worth paying attention to, the Patterson Power Cell should be mentioned, which not only can be used for generation of energy but, how could it be otherwise, also for reduction of radioactivity and for transmutation. The energy cell invented by the chemist Dr. James A. Patterson is researched and developed further by the company CETI (Clean Energy Technologies Inc.) in Sarasota (Florida, USA). According to latest reports such a device supplies at most one kilowatt of heat energy at an over-unity of up to 4000; thus 4000 times the energy is released than is taken up as required for the operation!
In fig. 17.4 one single cell of the energy converter is shown. The glass container consists of three chambers of approx. 4 cm height each time and about 1.9 cm in diameter and works like a continuous-flow water heater. From the bottom tapwater or distilled water is supplied and at the top connection again taken away in heated form. The excitation takes place electrostatically by means of two platinum electrodes. The anode situated at the top is connected with the positive pole and the cathode with the negative pole of the source of direct current.
In the three chambers are situated tiny, filmy coated small balls, which form the real principal item of the cell. Production method and structure of the beads are oriented to the task to be mastered. In the case of a variant conceived for the generation of energy the barely one millimetre in diameter small synthetic beads carry after each other a thin layer of palladium, a layer of nickel and once again one with palladium<i>.

The small balls remind with their layered structure at first of the Orgon accumulator of Reich. They also seem to function as collectors of neutrinos, but for smaller wavelengths and much higher frequencies. In addition is chosen a concentric arrangement with the spherical form, which with the electrically conductive surface and the dielectric core fulfil the function of a cavity resonator. Resonance actually is possible with flying past neutrinos, which have a wavelength which amounts to an integer multiple (1,2,3,..) of twice the diameter of the sphere.
The arising resonant oscillation however concerns not only the electric and magnetic fields, but by means of electrostriction and magnetostriction also a mechanic oscillation of size. The oscillation of size in reverse causes again oscillating electric and magnetic field pointers, which are partly open along the spherical structure and can interact resonant with further neutrinos. In this repercussion field the actual secret of the functioning of a Patterson-cell is hidden.

The president of the German association of space energy, Prof. Dr. Dr. Josef Gruber on the occasion of his visit at the company CETI and of a conference about „cold fusion" in Vancouver has published a report<ii>:

<ii>: Gruber, J.: Kalte Fusion und Raumenergie, report concerning the 7th international conference about "cold fusion" of 19.-24.4.1998 in Vanvouver, B.C., Canada (Infinite Energy, Issue 19, 1998) and report concerning "International Symposium on New Energy" of 23.-26.5.1997 in Denver, Colorado, USA (Denver-report of the remote University Hagen)

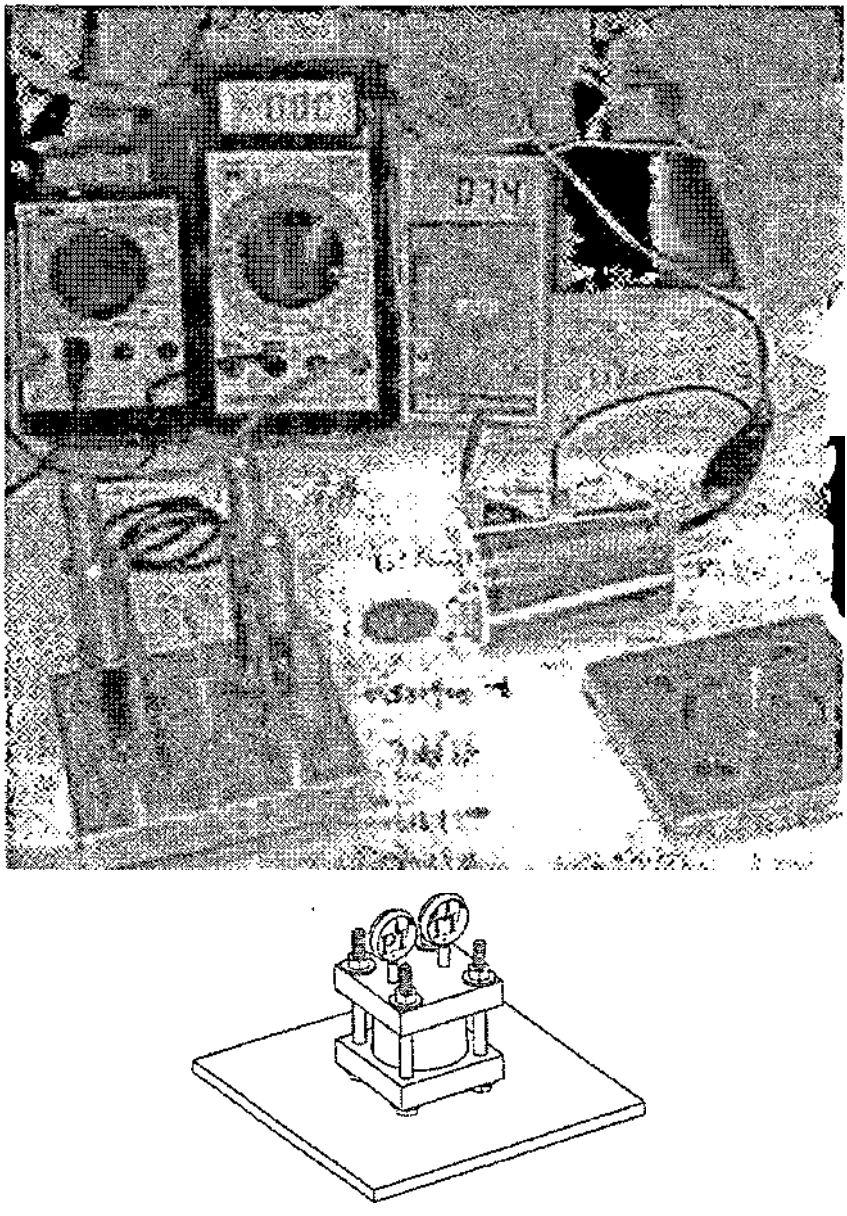


Fig. 17.5: Low Energy Nuclear Transmutation Cell,<i> the kit for experiments LENT-1 (Showing Temperature and Pressure Gags)

<i>: taken from the NET-Journal, 10/11 1997, S. 7

17.5 Report concerning the cold fusion

"In the case of the Patterson transmutation cell it concerns a special electrolysis cell, in which the radio nuclides are charged. During the electrolysis the decay activity measured by means of a Geiger-Muller counter decreases drastically. Within a few hours reductions of up to 80% are obtained. In such an electrolysis system with electrodes consisting of specially coated beads low-energetic nuclear reactions can be observed. In this case elements are detected in the metallic layers of the beads, which before were not contained in these. Further are measured changed (unnatural) proportions of isotopes. From these transmutation can be inferred, which is used in the cell for the conversion of radioactive elements.
Until now natural uranium and thorium were used as radioactive material. The reproducibility already now is very good. The applicability for commercial purposes, for the reduction of the radioactivity of burnt up fuel elements and for the conversion of plutonium is easy to see".
At his visit in the laboratory of CETI in Sarasota 28.5.97 Prof. Gruber has witnessed an experiment to annihilate radioactivity with the Patterson transmutation cell. He reported about it: "In the presence of N. J. Olson from Pacific Northwest Laboratory (operated by Batelle for the U.S. Department of Energy) a team of the television station ABC conducted by the science journalist Dr. M. Guillen made recordings for a television program, which meanwhile has been broadcasted all over the country. The original tension voltage - among others a Geiger counter rattled - subsided as the expected success became apparent in the experiment: After one hour 50% of the radioactivity stemming of uranium nitrate were removed, in another half an hour further 13%. Doing so also a considerable lot of surplus heat was produced.

New techniques of this kind to reduce radioactivity have an important advantage: One brings the SET-device there where the radioactive material is situated and reduces the radioactivity on the spot. For the conventional technique, still being in research, in contrast to that the radioactive material first is wrapped in a complicated manner and then transported to a special factory, where radioactivity is reduced at great technological expenditure and use of energy - altogether a procedure which is relatively costly and politically only hard to carry through".

Patterson cells already can be obtained commercially for research purposes. The same goes for a demo-kit[<i>] of the company Trenergy, Inc. of Hal Fox, who has built up the biggest database of the world concerning the theme "Low Energy Fusion" in the "Fusion Information Center" at the university of Salt Lake City. He is editor-in-chief of the "Journal of New Energy".
If one believes the statements on their web-site[<ii>], then one is capable of converting 10 g of radioactive thorium in 900 mg titanium and some copper in less than an hour with the kit for experiments LENT-1. Under a pressure of 3200 psi sodium already is said to have fusioned to gold, something of which alchemists dream, as an unintentional side effect, as researchers in Cincinnati/Ohio say[<iii>].

<i>: NET-Journal, Jan. 1997, S. 24
<ii>: see Internet: http://www.hal-fox@slkc.uswest.net
<iii> : NET-Journal, 10/11 1997, S. 7

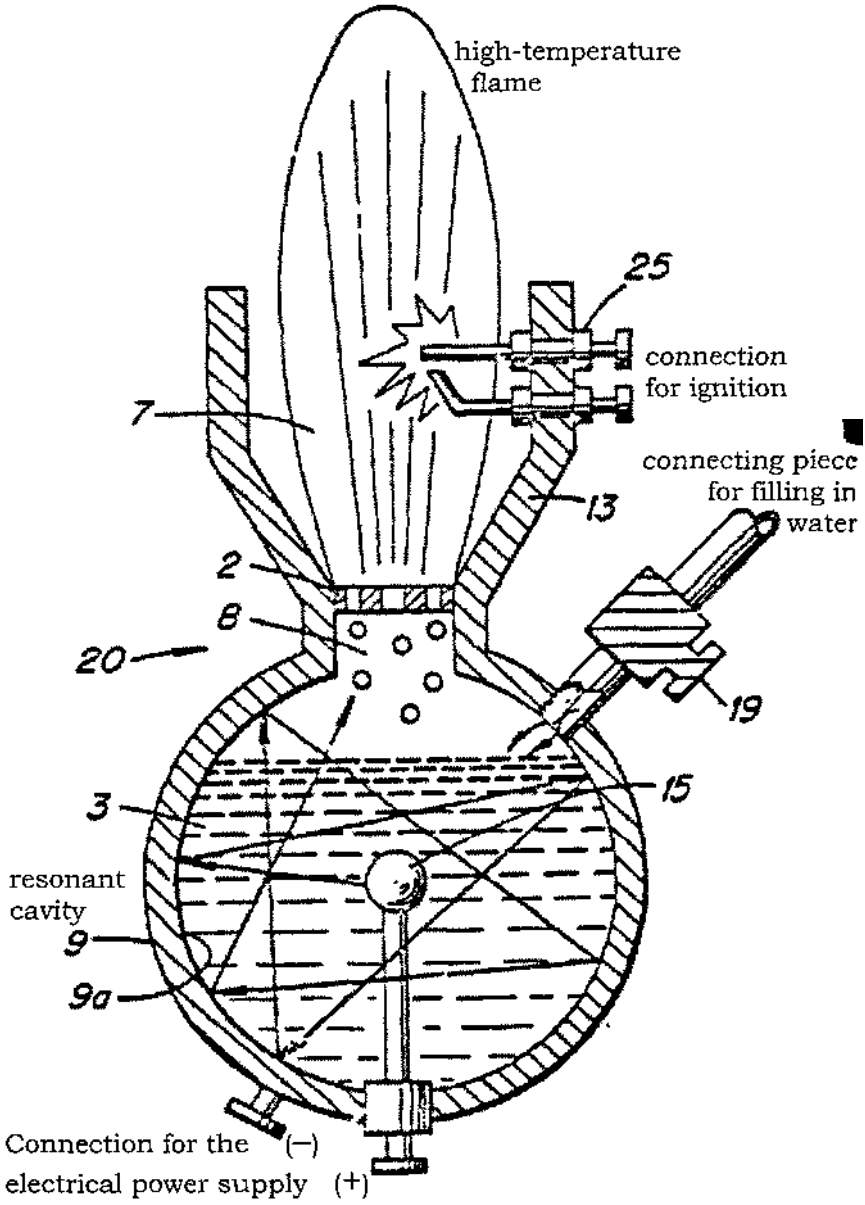


Fig. 17.6: The water-fuel-cell according to Stanley Meyer<i>

<i>: H.-J. Ehlers: Stan Meyers Wasser-Zellen-Technik, Raum & Zeit special 7, p. 201, taken from the Canadian patent specification 1234 773 of 5-4-1988

17.6 Water-Fuel-Cell technology

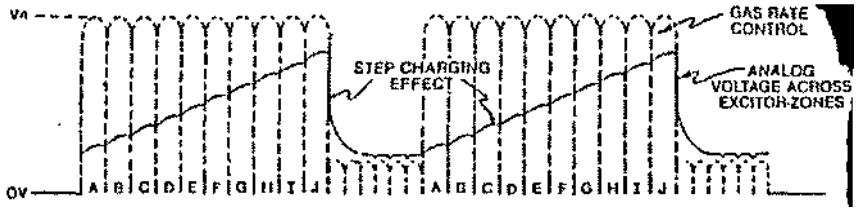
The United States are, just what concerns spectacular techniques like the removal of radioactivity or the transmutation of new materials, obviously still the land of unlimited possibilities. Nowhere the list of researchers of cold fusion is as long as in North America.
But there also in many places only is tried and tinkered without visible system or usable theory. Then in many cases unfortunately only a show-effect is to the fore, while construction plans and details concerning the way of functioning, as far as they actually exist, are kept secret. In total there, besides a lot of hot air and wrong hopes, is left behind little to be used and cited.
By the way, in my opinion cold fusion has to do very much more with space energy and neutrinos than with hot fusion. How much disaster a wrong referring to and an unusable theory can bring about, has become clear at the example of the "cold fusion researchers" Fleischmann and Pons. They have placed themselves into the scientific offside with their misinterpretation concerning cold fusion.
Moreover are both primarily scientists and theorists. Practice however is, according to general definition, "if in spite of all it functions!" The American Stanley Meyer is such a practical man and his water-cell-technology actually seems to function, although he in his 18 patent specifications gives theoretical explanations, which he just as well could have saved himself. With that his effect isn't explained.
An usable interpretation would be that this device, comparable to a cell of a plant during photosynthesis, splits water molecules into its parts by putting on neutrinos. Even without knowledge about space quanta the buggy of Stanley Meyer already runs with a air-cooled 1500 cc VW-engine, and it consumes no gasoline at all. The tank is filled with water; it even may be sea water. The consumption of water lies at 2.8 litres at 100 kilometres and thereby is formed predominantly hot steam again as a combustion product.
If thus cold water is converted into hot water and at the same time mechanical energy is available. then inevitably another source of energy must be involved. According to my interprelation it must concern the neutrino field. If the here presented details are correct then the over-unity effect lies at approx. 100, the degree of effectiveness thus at 10000 percent.

American companies, with which Stanley Meyer had concluded contracts, should make the "Water-Fuel-Cell technology" mature for series. Also the financing seemed secured. But then per internet the message came, he 21.3.1998 was having supper in a restaurant in Grove-City, as he suddenly jumped to his feet from the table and called out, he had been poisoned. He died on the spot<i>.

Alarge number of inventors is known, who tap space energy with the help of water. It concerns an increase of the content of oxygen or of the content of colloids, thus an improvement of the water quality. Or it concerns formation of vortices as already in the case of Walter Schauberger, glowing phenomena or also the generation of free energy from the neutrino field. In this concert the concept of Stanley Meyer takes an outstanding place, as particularly efficient, instructive and clearly understandable for us, for which reason we cast our eyes over the design (fig. 17.6 and 17.7).

<i>: Zum Hinschied von Stanley Meyer", NET-Journal April/Mai 1998, S. 25; see: obituary in Infinite Energy Magazine

A. The pattern of the pulses of the excitation voltage:



B. The wiring diagram:

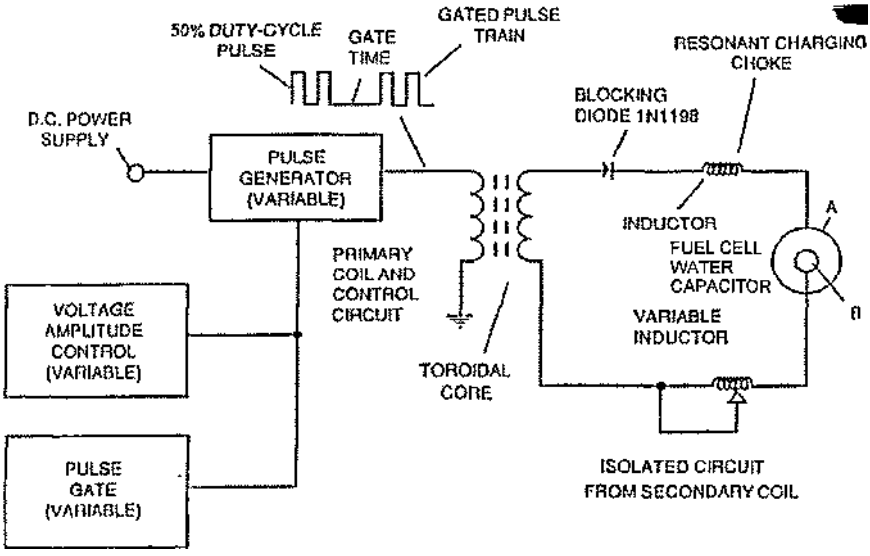


Fig. 17.7: Wiring diagram for the driving of the water-cell<i>

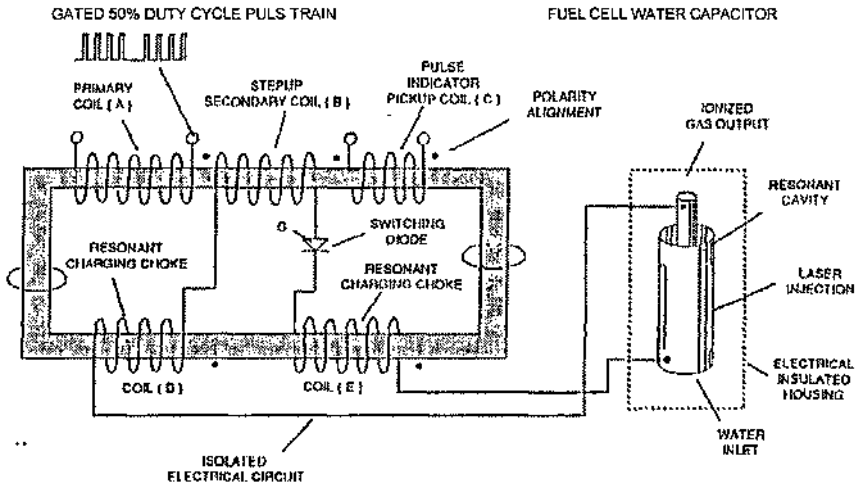
<i>: Stanley, A. Meyer: Process and Apparatus for the Production of Fuel Gas and the Enhanced Release of Thermal Energy from such Gas, 15.06.89, US-Pat. 207,730; International Publ. WO 89/12704; Int.Appl. PCT/US89/02622

17.7 Unconventional electrolysis

Numerous of the by Stanley Meyer used construction principles already have been treated, be it the excitation with pulses of electric tension voltage or the spherical structure of the resonant cavity (fig. 17.6). As a spherical capacitor with the positive pole in the centre and the negative pole at the outside edge it corresponds to the model of the electron and fulfils in an almost ideal way the conditions of an unipolar arrangement according to fig. 15.8 B. The use of certain patterns of the pulses and steep flanks of the pulses (large dU/dt) make possible effects of resonance at frequencies starting at ten kilohertz, in which neutrinos participate increasingly. First the series resonant circuit, consisting of the adjustable, external inductance and the spherical capacitor, is stimulated by means of the current rectifying wiring (fig. 17.7). In the case of resonance, which is carried out by comparison of the inductance, the excitation current drops, whereas the tension voltage at the same time teaches values of more than 1000 Volts. If in addition a neutrino resonance occurs, then the known avalanche effect will occur. The equipment then takes up virtually no current.

As a dielectric serves water, with which the container is filled permanently. The dimensions are oriented after the velocity of movement of the water molecules according to details of the inventor. Also the oscillating water molecules should go into resonance. Then they can help to materialize the neutrinos. Their rotational energy partly passes to the water molecules and as soon as the neutrinos have been converted to charge carriers, they will take the water molecule from the oppositely charged side and split it without further ado. The oxygen and hydrogen gases leave the capacitor through fine openings at the upper edge of the spherical chamber, which are so small, that no ignition back can occur, and in the simplest case reach a combustion chamber, where they burn again to water as a high-temperature flame (fig. 17.6).
The gases of course also can be guided into the cylinder of a Otto engine and be ignited there, as in the case of the experimental buggy. In the sectional drawing can be seen a filler by means of which, according to the consumption, water is refilled. The round resonant cavity not necessarily has to be spherical. Stanley Meyer more frequently differs from the ideal form and works with a cylindrical symmetry (fig. 17.8), with which obviously in spite of that the goal can be obtained, if perhaps not quite so good. To this compromise the explanations of fig. 15.8 C apply.
If we, to conclude, cast our eyes over the wiring diagram which Stanley Meyer discloses in his patent specification (fig. 17.7 and 17.8)[<1>]. In the centre is a transformer, which should produce an if possible high tension voltage. A rectifying diode, which takes care that only positive tension voltage pulses serve the excitation, is switched in series with the reaction capacitor, which is filled with water, a fixed and a variable inductance. In that way the positive pole is always situated in the centre of the reaction chamber. If both connections would be exchanged or the diode be turned over, then the neutrinos presumably would materialize in positrons and not in the wanted electrons. But if one leaves out the diode entirely and one has a tension voltage changing both in positive and in negative direction, then maybe electrons and positrons are equally generated, which annihilate each other under emission of gamma quanta. Doing so no gas is formed, but at most light, as long as the effect of collecting neutrinos isn't lost also. The concept should be worth to be examined more detailed already of pure scientific interest.

A: The high-tension transformer:



B: The driving:

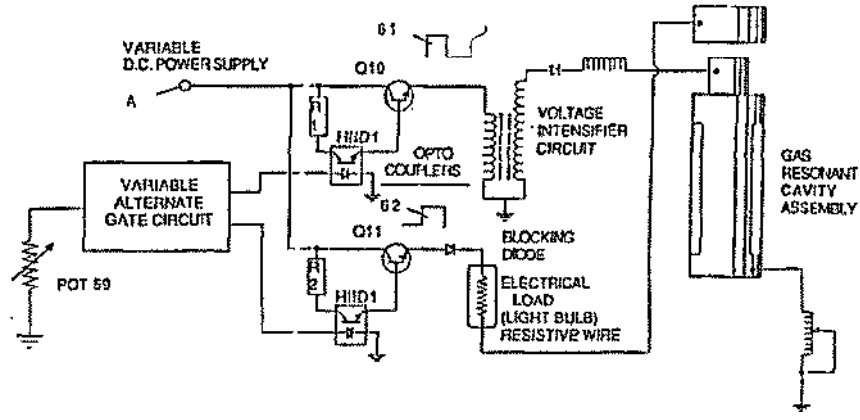


Fig. 17.8: High-tension transformer and driving of the cylindrical water-cell<i>

<i>: Stanley A. Meyer: Process and Apparatus for the Production of Fuel Gas and the Enhanced Release of Thermal Energy from such Gas, 15.06.89, US-Pat. 207,730; International Publ. WO 89/12704; Int.Appl. PCT/US89/02622

17.8 Materialization of neutrinos

In the centre of attention of the water-fuel-cell of Stanley Meyer is on the one hand the unipolar arrangement (according to fig. 15.5 B or C) to collect the neutrinos and on the other hand the water for slowing down and materializing. Over and above that a lot was tinkered and tried, as can be inferred from the patent specifications (fig. 17.8). That starts at the. coiling technique of the transformer and concerns the experiments with laser stimulation as well as the top part, which according to the inventor should extract the electrons (Electron Extractor Grid). The measures may bring an improvement, but are insignificant for our considerations.

At this place it primarily concerns the question of the materialization of neutrinos. But if such a materialization has to be made complete, if water molecules must be splitted, depends on how long the process lasts. If everything goes very fast, then perhaps it is sufficient that a neutrino for a short time is showing as an electron, before it again oscillates back. In this short time the splitting process already could have taken place. The used neutrinos for that had to be very low-frequent and very slow. They after that could again leave the reaction chamber and fly on as neutrino.

Possibly the fishes, which live in stagnant waters or in the deep sea, owe the slow neutrinos the content of oxygen in the water. Because here no bundling up takes place, the splitting of water takes place rather by chance. The volatile hydrogen atoms escape very swiftly, whereas the big oxygen atoms are left behind in the water.

Now we still don't know how charge carriers can be won. At the RQM unit resonant oscillations of size had been measured and that can be judged as an important clue. If namely a space quantum is slowed down then it becomes bigger. The inverse case we already had made us clear: If a particle is correspondingly fast then it is sufficient length contracted to fit through the tunnel (fig. 6.14).

To slow down neutrinos according to that the target area should carry out an oscillation of size with opposite phase. Organic material and biological systems are excellently suited for that. Every contraction of a muscle brings that to mind. Inorganic matter and our technology however normally don't know this phenomenon. Technical energy converters simply are built up fundamentally else than biological muscle machines.

In historical sources at certain places is pointed to the fact that priests had experimented with quartzes and miraculous phenomena were observed. Of course the question is asked, if such experiments today still can be reproduced. Because the density of the earth slowly increases due to the growth in volume, also the wavelength of these oscillation quartzes is changed. The same neutrino radiation therefore today can't be active anymore. It thus would be completely inappropriate wanting to reject a historical source only because a described effect today doesn't want to function anymore.

Magnetostrictive or electrostrictive material could be a solution. For instance a piezocrystal, which contracts under the influence of an outside field. As an ultrasound converter an applied alternating voltage leads to the emission of a sound wave. If we reverse the function, then a received longitudinal wave should lead to an electric tension voltage and then at last the materialized charge carriers could be taken off,!

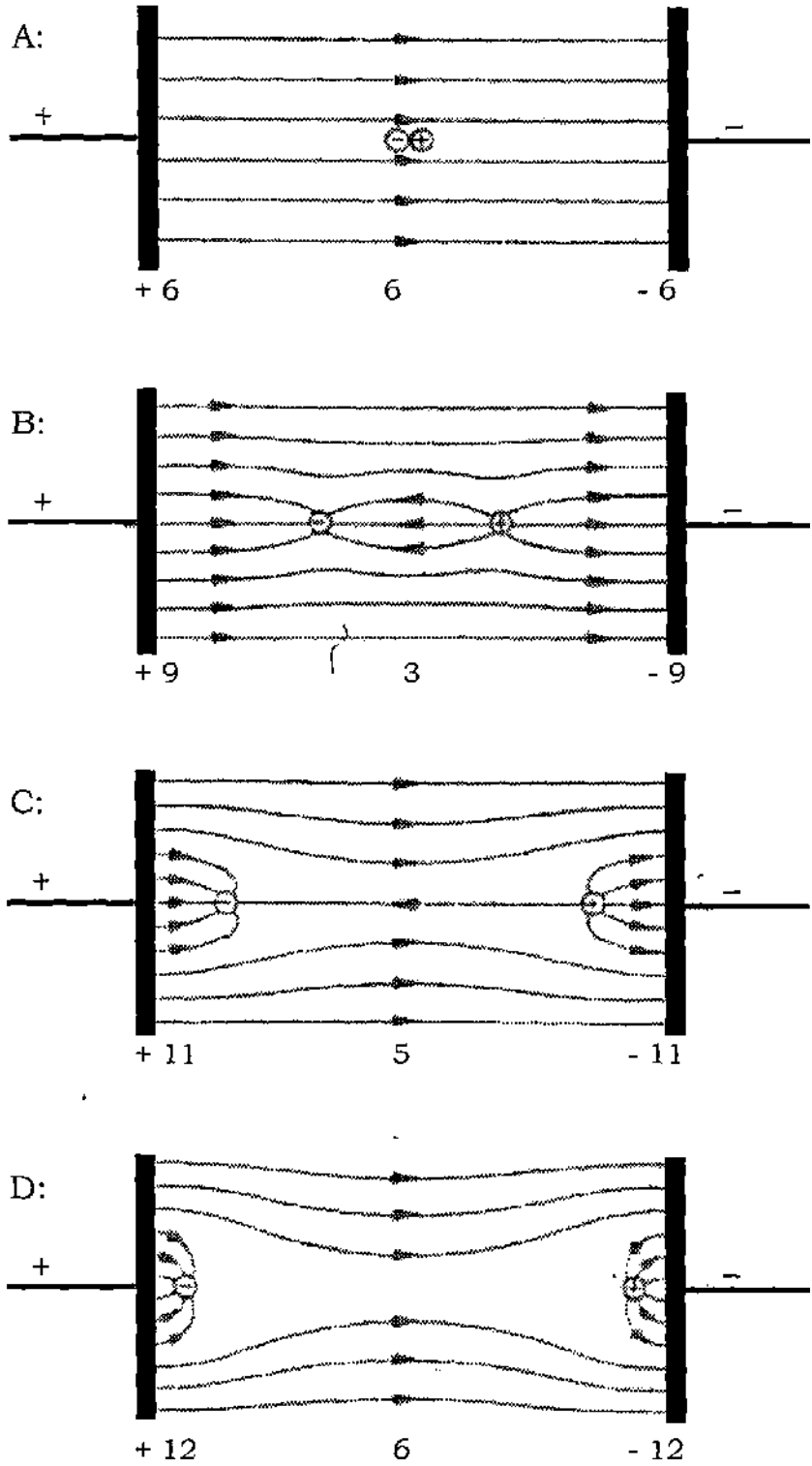


Fig. 17.9: The course of the field in the case of a glow-discharge[<i>]
(The numeric values indicate the active field lines, as they can be read from the representation).

<i>: K. Kupfmuller: Einfuhrung in die theoretische Elektrotechnik, 12. Aufl. Springer-Verlag (1988), S. 197

17.9 Oscillation of size and luminescence

There exist substances, which at high temperatures start to glow. In the sense of the theory of objectivity presented in the first part of the book in the case of temperature it actually concerns an oscillation of size of the involved elementary particles (fig. 8.3). If this oscillation of size lies in the visible frequency range, then we can directly perceive it and it can be used for instance in a light bulb for the purpose of lighting.
In the case of an arc. fluorescent tubes or glow-discharge lamps light is formed as well even without a thermal effect. These glowing phenomena are called luminescence. They can be caused by chemical processes, by friction, by crystallization or by electric fields. As can be shown speedily, in these cases it also concerns an oscillation of size.

If we for that consider the model on the left (fig. 17.9). Between two electrodes there is a non-conducting gas, e.g. air. If now a tension voltage is applied then, under the influence of the electric field, some gas atoms are splitted into positively charged ions and negative electrons (case A) and pulled apart (case B). This process of enlargement of the glow-discharge fast as lightning comes close to that of the thermal oscillation of size and obviously in the same way is perceived as light.
The ionised gas parts are attracted by the unlike poled electrodes and move towards these (case C, D). Whoever takes the effort to count the number of the field lines, will find out that between both electrodes the electric field drops, whereas it at the same time increases at the electrodes. The first thing causes that the process of ionisation is stabilized by itself and a state of equilibrium will result; the resulting current takes a constant value.
The increase of the tension voltage at the electrodes on their behalf causes that an arc remains standing or the glow-discharge lamp glows on, even if the feeding voltage is reduced. For this reason a fluorescent lamp needs a starter, since the network voltage is too small to start the effect of luminescence.

We indeed know, that the gain of light of a fluorescent lamp is at least three times better than that of a light bulb. As a rule a degree of effectiveness in spite of that can't be given, since it merely concerns a comparison measurement in the case of the measurement of the lighting intensity with a luxmeter. It hence can't be excluded, that we already are dealing with an over-unity effect in individual cases and neutrinos are involved in the effect of glowing.
A necessary oscillation of size would be present, as the perceivable noises of open spark gaps prove. Also in the case of lightning the thunder occurs as a consequence of a longitudinal oscillation of size and at the same time a glowing phenomenon occurs as a consequence of materialized neutrinos (fig. 14.11). It almost is obtruding a scientist that here the same principles are at work.

One however hardly can prove that neutrinos are involved in the luminescence, because the configuration is symmetrical with regard to the resonance of neutrinos and just as much particles materialize as anti-particles, which afterwards again annihilate completely as an impulse of light. They hence can't be measured directly. It gets interesting if an asymmetrical arrangement with unipolar character is chosen.

Fig. 17.10: Tesla with a wireless light bulb[<i>]

<i>: A Sarony-Portrait from 1894, Tesla-Museum, Belgrad

<ii>: R. Hiller, K. Weninger, S. J. Puttermann, B. P. Barber: Effect of Noble Gas Doping in Single-Bubble Sonoluminescence, University of California, Los Angeles, USA, Science, Vol. 266, 14.10.1994, P. 248-250

and: D. Lohse: Wenn sich der Schall in Licht verwandelt, Mechanismus liegt noch im dunkeln; (University of Twente, NL) Mitteilungen der DFG 4/98, S. 19-21

17.10 Phosphorescence and sonoluminescence

Let us first look at the observable after-glowing at fluorescent lamps or at a screen, the phosphorescence. It presupposes a storing effect, and that in accordance with prevailing textbook opinion can be traced back to the excited state of some atoms. Doing so electrons in the atomic hull change from one level of resonance, an instable state of energy, to another orbit, which represents the ground state. Doing so the difference in energy is emitted in the form of light. The process obviously not only takes place as luminescence during the switching on of the excitation voltage, but also as phosphorescence after the switchng off.
An enveloping electron now doesn't fly as a tiny planet around the nucleus, but occupies the entire orbit as an inflated spherical vortex (fig. 5.5). Seen from the outside it is a matter vortex. It however sees the enveloping electrons on the further on the outside lying orbit from the inside and there they are showing as anti-matter vortices. As long as the distance of respect is kept, nothing happens. If however an inner spherical vortex presses to the outside or the outside one to the inside, then the incompatibility of the vortices takes effect and both annihilate under emission of a photon. In this respect the explanations of the vortex model are very helpful.
But now, after this flash of light, two electrons are missing in the atomic hull. The positively charged atomic nucleus never would allow this loss. Replacement has to be fetched and that actually only can stem from the neutrino field. Therefore the enveloping electron doesn't change the orbit immediately, but instead has to wait, until a suitable neutrino passes by, with help of which the game of changing places can be executed. This explains the time delay and gives reasons for the observable after-glowing.

The form of the unipolarly charged sphere (according to fig. 15.8 B) forms almost ideal prerequisites for an interaction with neutrinos and the step-like change of size from one orbit to the next ideal prerequisites for their materialization. The longitudinal wave connected with the change of orbit without doubt can be called a high-frequency sound wave. It however can't be detected because of missing gauges for such high frequencies.
But if we take the frequency down into the range of the ultrasound, which can be handled technically, then effects arise which brilliantly prove this interpretation and the participation of neutrinos in the luminescence.

The not understood phenomenon is called sonoluminescence and at present is researched at numerous high schools primarily for academic interest. The structure is conceivably simple. One takes a ball of glass filled with water and positions at the edge one piezocrystal next to another. Then one with the piezo loudspeakers, operated with the same phase, sounds the whole with ultrasound and see there, the water glows mysteriously! The sound waves change the pressure. Inferring from the observations, during the phase of low pressure small bubbles are formed, which at the following rise of pressure collapse and emit a ultrashort flash of light. There thus takes place an oscillation of size, which leads to the luminescence phenomenon!
So far so good; but such a flash of light is much shorter than the collapsing of the gas bubble lasts. With less than 50 picoseconds it is faster than the otherwise usual atomic transitions of electrons. The whole thing obviously has nothing to do with this kind of luminescence. Also the spectrum doesn't fit and finally the over-unity effect lies at one trillion, the light energy thus is 10^{12} times larger than the energy part which is taken up from the sound wave by every atom<ii>!

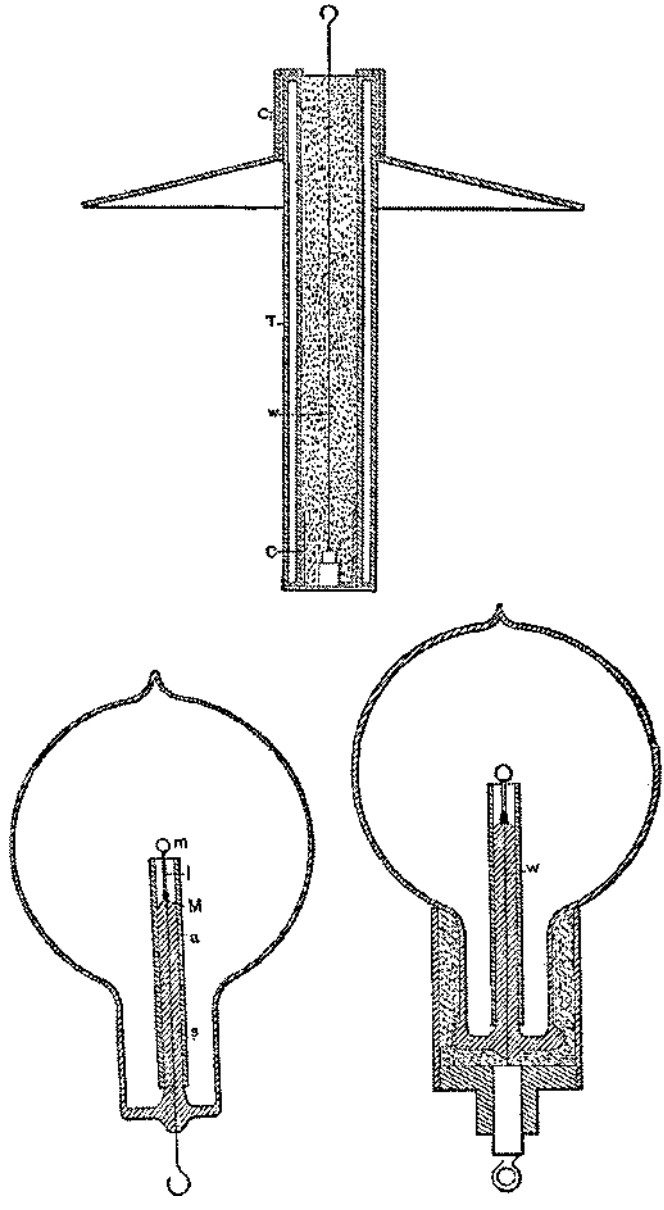


Fig. 17.11: Light bulbs according to plans of Tesla[<i>]

<i>: N. Tesla: Experiments with Alternate Currents of High Potential and High Frequency, Lindsay Publications Inc, ISBN 0-917914-39-2, Fig 18, P. 70+103

17.11 Discussion concerning the use of the weak interaction

In the case of the luminescence the conditions lie similar like those for lightning. The science of today it is true has some problems of explanation at detail aspects, but again and again manages to protect the ivory tower of physics from collapsing, with supporting auxiliary explanations. But at the latest in the case of an unipolar arrangement, in the case of a ball-lightning or the sonoluminescence, the participation of the neutrinos clearly comes to light, the auxiliary concepts prove to be unusable.

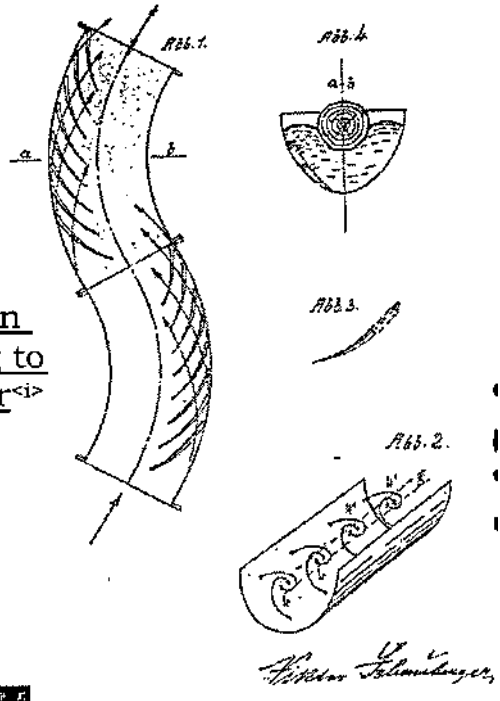
It surely is no accident that the discoverer of the neutrino radiation also was the first, who has experimentally investigated the luminescence. The lamps of Tesla (fig. 17.11) all were without wear and didn't have filaments like those of Edison. They however had to be operated with high tension voltage and relatively high frequency. Both a single-wire and a wireless transmission technique were possible (fig. 9.5 and 9.7). In his laboratory Tesla only needed to hang a fluorescent lamp without any return cable on a wire, then he had light. Famous also are the pictures on which he holds a lamp in his hand, which glows entirely without any connection, but only if he takes it in his hand! (fig. 17.10).

If we again turn through the chapter, then it is remarkable that in most cases, from the transmutation to the luminescence, neutrinos can be used for reason of their resonant interaction which in the proximity can be put equal to the weak interaction. A real materialization however poses an enormous difficulty. If namely the translatoric motion of the space quanta is slowed down, then the risk exists that for balance the rotation increases. But that as well has to be slowed down for a materialization! Only if both processes of slowing down take place, the goal can be reached. In that case the described cooling down effect occurs.

For a measurement technical check it therefore offers to record the slowing down of the translatoric motion and the collecting of the neutrinos by means of the measurement of the radioactive decay of a sample. And to read the materialization as the slowing down of the rotation from a measurement of temperature. In addition are helpful proofs about oscillations of size, glowing phenomena and deviations in the balance sheet of energy. With that it should be able to obtain a system for the exploration of these phenomena with the goal of a practical exploitation of the neutrino radiation for the benefit of humanity.

A:

Floating installation for wood according to Viktor Schauberger[i]



B:

Ancillary part for shower according to graduate engineer Wilhelm Martin.[ii]

Fig. 18.1: Mechanical whirling of water

<i>: N. Harthun: Naturgemasse Stromungsfuhrung nach Viktor Schauberger Analyse einiger seiner Patente und Zitate; MuT Nr. 4, 1980; s.a. Kap. 9.2
<ii>: O.Alexandersson: Lebendes Wasser; W.Ennsthaler Verlag Steyr, 1993, S.156
<iii>: V. Schauberger: Die Entdeckung der Levitationskraft, Implosion 112, S. 39.
<i4>: Do we owe the taste of bubbling spring water to neutrinos?

18. Physical phenomena

In this chapter it on the one hand concerns indirect effects of the resonant interaction and on the other hand effects of gravitation and levitation.

18.1 Water as a catalytic converter for neutrinos

Already the Austrian forester Viktor Schauberger has pointed to glowing phenomena at whirled water. He first had observed such in nature at torrents and waterfalls in the Alps. Later he was capable, to produce and to demonstrate this effect even artificially[iii]. One could speak of hydroluminescence, where still the question would be left open, how it actually functions.

Already in chapters 4.10 and 4.11 has been talked about the special properties of water. It here at first concerned the property of transport of a vortex, which even is capable to bind particles in the vortex, which are heavier than the whirling medium itself. Schauberger had become famous by letting build floating installations, in which not only tree-trunks, but also gravel could be transported down to the valley, without the sides of the channel actually having been touched by the rubble. This phenomenon has been examined and confirmed on the scientific side [i].
Basing on this principle today different devices for processing water are offered and sold, which bind lime, mineral materials and suspended matter in the vortex and in this way prevent deposits in the pipes. The methods, to whirl the water, are however very different. Some whirl the water mechanical, others magnetically and again others electrically.
Here the dipole nature of the H_2O-molecules has an effect. If I turn a water molecule with its electric charge distribution, then from the moving charge a magnetic field results. If thus in the pipe a hydrodynamic flow vortex is produced, then an electric and a magnetic vortex, the potential vortex and the eddy current, are the result (see fig. 4.2). The wanted flow vortices vice versa also can be obtained, by guiding bubbling whirled water past permanent magnets, or by feeding in alternating magnetic fields with the help of coils, or finally by working with pulsed electric potentials. Each of these systems, operated passively or actively, has its specific advantages and disadvantages (fig. 18.1 B and C).

It can be assumed that with the vortices also the water quality is changed. As a rule the content of colloids increases, due to which the surface tension falls. In the colloids negative ions are bound, for which reason also the electric conductivity decreases. Finally the content of oxygen increases and that actually only can come from an electrolysis. The neutrinos thereby are suspected [i4].

As an extreme dielectric medium water favours the formation of potential vortices, which immediately after their formation contract swiftly. This oscillation of size of the electrically charged potential vortices makes possible actually an interaction with neutrinos, and that on the one hand has as a consequence the water splitting and the increase of the content of oxygen in the water and on the other hand the above depicted, observable glowing phenomenon, the hydroluminescence.

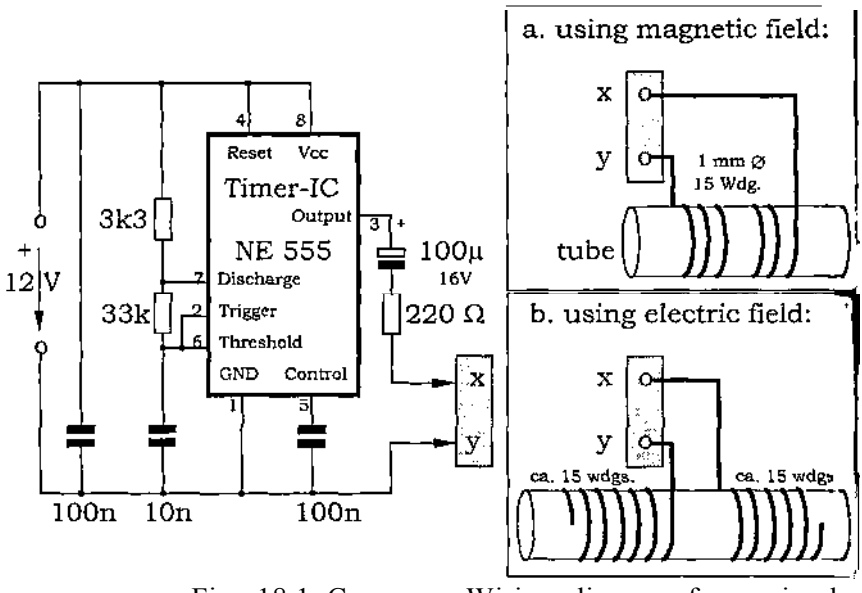


Fig. 18.1 C: Wiring diagram for a simple water processor
with pulsed field (2 kHz rectangular signal)
a: for magnetic field excitation
b: for electric field excitation

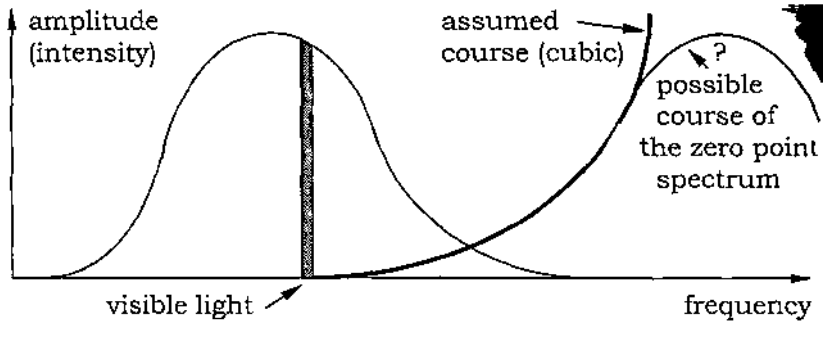


Fig. 18.2: The spectrum of frequencies of light and of the zero
point radiation.[<i>]

<i>: A. Waser: The Puzzling Nature, AWVerlag Luzern 1996, p. 88

To complete in fig. 18.1 C the wiring diagram of a simple water processor is shown, which works with pulsed electric (b) or magnetic (a) fields.

If we temporarily again leave the theme water and take along the notion, that it must be attributed a great importance in connexion with the interaction and the materialization of neutrinos

18.2 Background and zero point radiation

Whathappens really, if cold matter or interstellar gas molecules are hit or touched by the everywhere present neutrinos? Then it can be expected that oscillations are being stimulated and as a result the temperature slightly increases. If we thus at a space flight hold a thermometer out of the shuttle window, then we will measure everywhere such a remaining temperature of a few degrees Kelvin, which is called cosmic background radiation.

By popular scientific small talkers the background radiation is called remnant of a so-called Big Bang. It even is misinterpreted as evidence for the Big Bang. Even if a certain value of entertainment can't be denied, the Big Bang from a physical view until now only has raised questions and contradictions.

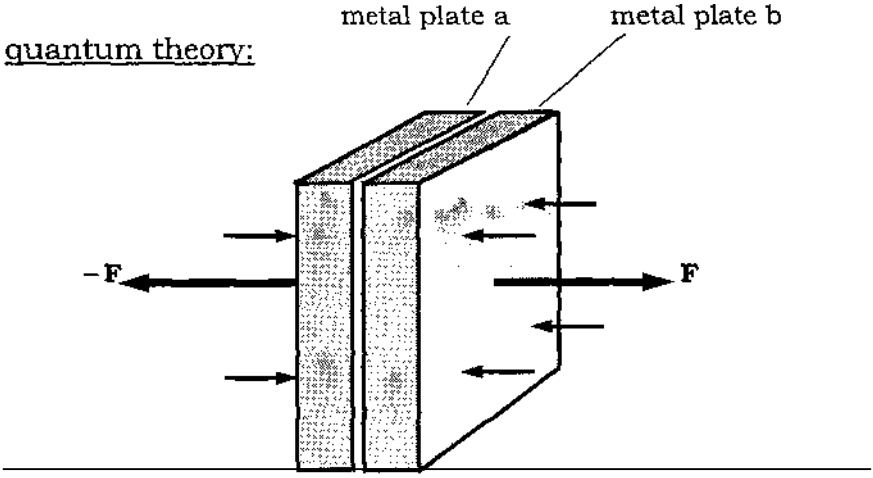
If we stay at the fact that oscillating neutrinos depending on their radiation density and velocity of propagation produce a thermal oscillation, which can be detected as a slightly increased lemperature. To measure that we don't need immediately to undertake a space flight. We also can install the thermometer in an artificially produced vacuum. In vacuum physics out of ignorance of the relations the neutrino radiation then is called zero point radiation.

In the case of the neutrinos it of course concerns an oscillation around a mean value, which for a symmetrical form of oscillation has the value zero. The term nevertheless is misleading and chosen very unfortunate. After all we don't speak of zero point current in the case of alternating current!

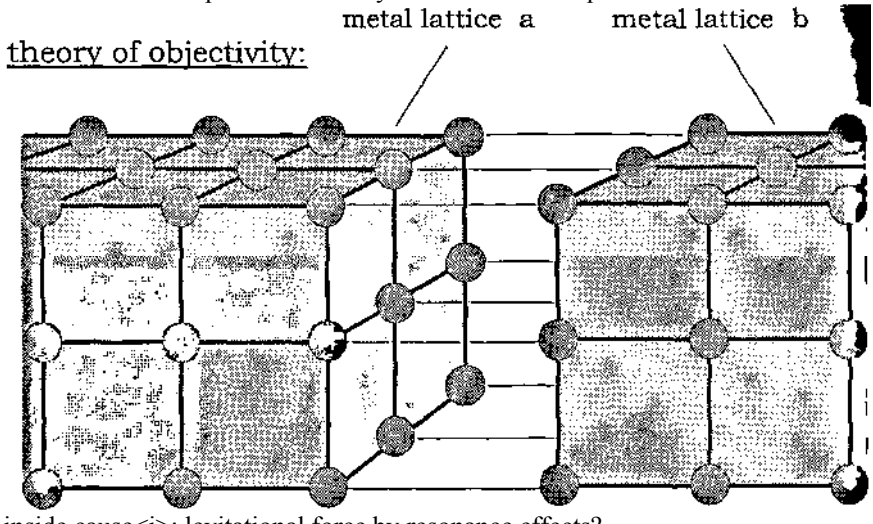
Since every supernova and every black hole emits neutrinos and correspondingly in physical experiments until now no preferred direction could be determined for the zero point radiation, it is taken as homogeneous and isotropic in space. From the Lorenz invariance again is inferred a cubic course of the zero point spectrum, an increase of the radiation intensity with the third power of the frequency. With this assumption the radiation density of the vacuum however strives with increasing frequency towards infinity. Here an error has to be present in the considerations!

I proceed from the assumption that in the case of the spectrum of the neutrino radiation it rather concerns a spectrum of resonance, the maximum value of which lies above the frequency range measurable with devices of today. It of course would be very important to find out, where the radiation maximum lies, but without being able to measure it that lies unfortunately in the range of pure speculations (fig. 18.2).

Half the wave length in any case should be tuned to the length of the antennas of the energy centres of the cells, the mitochondria and the chloroplasts which are capable of photosynthesis. In both cases the head diameter of the ATPhases amounts to approx. 5 nanometer. It would be obvious, if the resonance point would lie here. But it could as well lie at still smaller wave lengths in the domain of molecular dimensions.



outside cause<i:>: pressure force by bombardment of quanta?



inside cause<i>: levitational force by resonance effects?

Fig. 18.3: The Casimir effect

18.3 The Casimir effect

If this zero point radiation actually would be the cause of the Casimir effect, which is generally assumed today, then neutrinos would have to be involved, if the zero point raditation would be to put equal to the neutrino radiation. The effect even is quoted as evidence, but I have my doubts.

The experiment is relatively simple and functions also in a vacuum. Two absolutely plane and smooth polished metal plates are placed very close to each other. Doing so the distance should only amount to one thousandth till one millionth of a millimetre. If the force, with which both plates are attracting mutually, is measured then it exceeds by far the gravitational force. We are dealing with an unknown force, neither electric nor magnetic.
Because the force of attraction still arises near the absolute zero of temperature, some make the zero point radiation responsible. In our translation that would be tantamount to the neutrinos exerting a pressure from the outside on the metal plates, if need be with their small rest mass, as far as this should not be based on an offset-error of the detecting devices. For that the plates would have to damp the neutrino radiation effectively and by mutual shielding reduce the radiation pressure from the split. The question is asked, if the from the outside hitting bombardment of quanta, as it is called, actually can exert a pressure which would be compatible with the nature of the neutrino radiation.

If we now try an entirely other interpretation, which does without the postulating and designing of new force effects. Now the from the unified theory won interactions according to table 15.1 form the basis. In the Casimir effect, as said, neither magnetic nor electric forces are involved, so that open field lines and the corresponding force effects (1 till 4) are ruled out. It has to be the work of closed field lines and that in the static case we know as gravitation (5). Now the mass of the metal plates is too small, as that an acceptable force of attraction of masses could result.
The measurable force is much larger, even if it according to its nature could be a gravitational force. Here oscillations, as they actually take place in the hull of the metal atoms, seem to play a role. If between the oscillations of the two plates standing opposite occurs resonance, then a levitation is possible (6), which describes an oscillating interaction, produced by closed magnetic field lines<i>.
At extremely low-frequency signals this interaction is known as gravitational wave and object extravagant and costly physical experiments.

<i>: The question, which interpretation is correct and which one should be rejected, could be verified as follows: at first the force between two plates of a certain metal and afterwards that of another metal has to be measured. If in a third experiment a plate from the first and one from the second experiment are brought together and the force effect goes back measurably, then the quantum physical interpretation would be wrong clearly. With that would have been shown that here resonance effects are used, which presuppose an identical metal lattice structure of both plates.
If the force effect however doesn't go back, then both statements are possible, then one has to think up another experiment.

Fig. 18.4: The flying disc of Searl on a german title page.<i>

<i>: Special 7, Raum 8s Zeit Dokumentation aus dem EHLERS Verlag

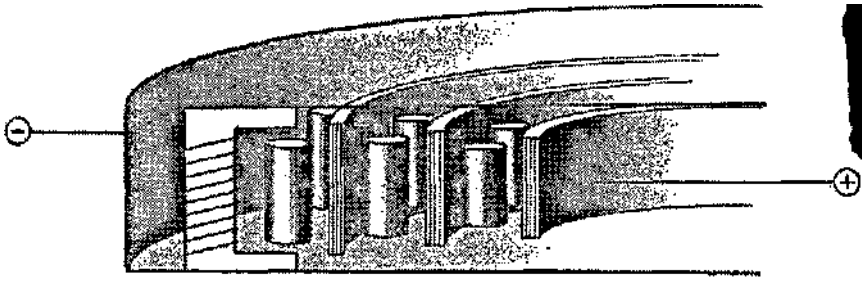
18.4 Effects under high tension

It crackles in the laboratory of high-tension. The air smells electrically charged. Only in a corner someone sits and waits with much perseverance and patience, until something happens. Then he lets thunder down lightnings of several millions of Volts on a small sample. It flashes and crashes and still nothing happens.
No, it doesn't concern Tesla! Tesla has worked purposeful. In addition has Tesla only called himself inventor. But the man in the corner feels himself a discoverer and as it is proper for a discoverer, he has immediately named the effect after himself. As a real American he lets market himself and his discovery by the media and a video tape.
Doing so he obviously doesn't know at all, what he wants to have discovered, of what this Hutchison effect actually consists. It perhaps is an event of pure chance, for which he sometimes has to wait hours. If it very suddenly would occur, then it is a real potpourri of all already discussed effects: metal spoons are bending (fig. 14.13), massif steel rods are breaking, light effects are being observed (chapter 17.9 PP), water starts to dance and to cook (chapter 18.1), without getting hot and finally do some samples take off and fly crosswise through the room. He then speaks of anti-gravitation.
In the video tape can be seen, how he brings about a physical length contraction as a result of a locally produced field concentration with two as an interferometer configured Tesla coils. In a bottle for instance the air volume is changed. This confirms the correctness of the here presented theory of objectivity (chapter 6.6 PP).
In any case no-one is amazed more about the results of chance than John Hutchison himself. Overwhelmed by the magic, the charm of the effects and the feeling to be able to move freely outside the trodden out ways of physics, he still sits in his corner with the video camera and waits, until finally something happens again.

There is worked with tension voltages, which are considerably higher than 511 kV, the calculated tension voltage of their own of the charge carriers (fig. 7.1). One thus by no means has to be amazed, if under the influence of several millions of Volt electrons are taken apart and metallic objects are breaking or bending.
The extreme tension voltage and field change we owe an oscillation of length and of size, which spontaneously can lead to an interaction with neutrinos. Materialized neutrinos again are responsible for glowing phenomena and for the electrolysis of water, which under the impression of the rising gas bubbles seems to dance and to cook. For my readers and participants of the energy technical seminar therefore models of explanation are available.

One effect we still haven't discussed and analysed more in detail: the antigravitation resp. the levitation. As long as no reproducible field conditions are present and the chunks are accelerated in any arbitrary direction, it will be difficult to understand the physical course of a levitation.
In chapter 9.3 we already had become acquainted with and discussed a levitation device with the flying disc of John Searl. for which the field conditions are comprehensible. This time we should have a somewhat closer look at the flying device (fig. 18.4)<i>.

<i>: Some reports can be found in Special 7 ,,Freie Energie", Raum & Zeit Dokumentation aus dem EHLERS Verlag, Seite: 141 bis 157 und 174 bis 185



disc rebuild to a power generator

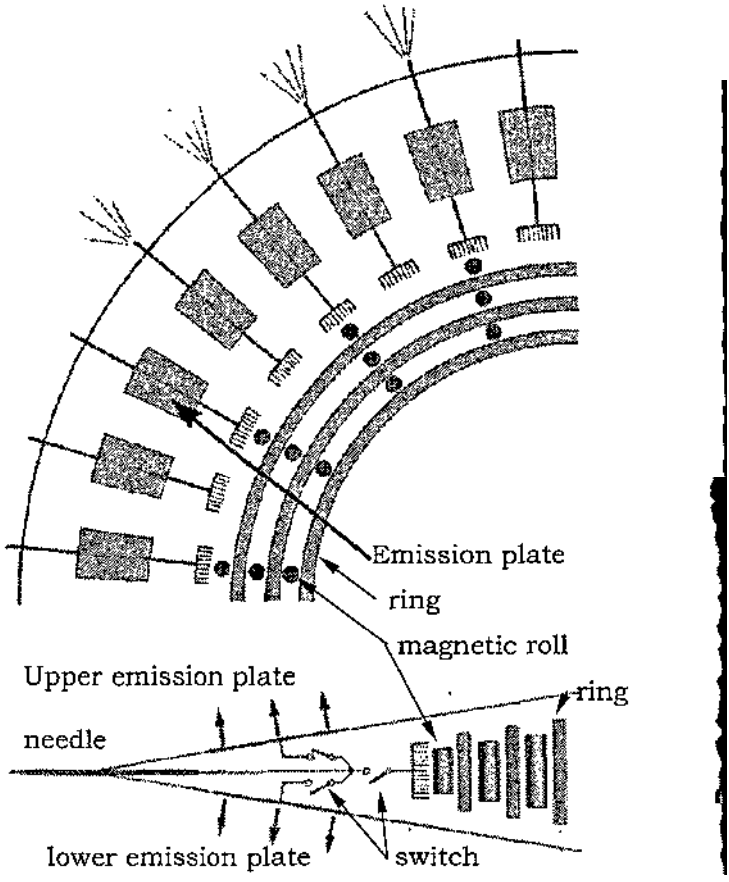


Fig. 18.5: Concerning the controlling of the flying discs according to Searl.[<i>]

<i>: H.Schneider, H.Watt: Dem Searl-Effekt auf der Spur, Special 7, Raum & Zeit Dokumentation aus dem EHLERS Verlag, Sauerlach, 1. Aufl. (1994), S. 183

18.5 Flying discs

The Searl-disc can be calculated relatively good with the Faraday equation concerning unipolar induction. To estimate the order of magnitude, we just suppose the roller magnets produce an induction of one Tesla and the radius is one meter, then between the centre of the flying disc and its edge 511 kV is applied, if the revolutions per minute has reached the value of 80000 revolutions per second. As soon as the revolutions per minute is reached, the neutrino conversion can start.
The at the edge of the disc arising corona, which consists of individual electrostatic discharge flashes, takes care for the necessary dU/dt, by every blow and every spark is drawing the potential for a short time towards ground. The tension voltage jumps in swift order between values of above 511 kV and zero Volt to and fro. In connection with the already discussed unipolar field configuration neutrinos are being collected in this way.

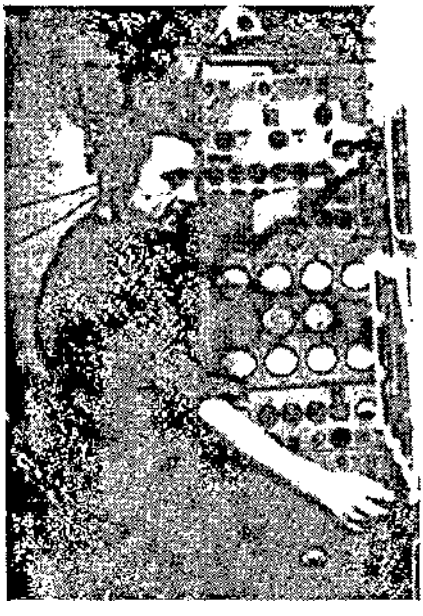
A technological challenge represents the layered construction of the roller magnets and the rings, which have to withstand extreme centrifugal forces (fig. 18.5). Friction however is not a theme, since on the one hand the air inside the disc ionises and a vacuum is formed and on the other hand the air split between rollers and discs increases by the field dependent contraction of the metal parts.

Actually one in this case by no means can speak of antigravitation, because the gravitation isn't really vanishing. The disc even in flight still is heavy tons. Here merely a resonant interaction is built up which is larger than the gravitational pull of the earth. The disc is attracted by the cosmic source of neutrinos, with which it has built up the resonance.
Exactly there it will fly!

The by Searl designed controlling<i> in my opinion actually can't have functioned satisfactorily. He uses emission plates, as he calls them, which alternatively are switched on by means of switches and are able to form electrostatic forces with some air charge carriers. In reality the drive probably is comparable to that of a sailing ship, for which the wind always blows from one direction. The ship isn't pushed by the wind, as one erroneously could think, but rather by the under pressure behind the sail pulled forward. Without steering facility the object always is driven in direction of the drain. The sailor would say,
the ship without helmsman drifts towards lee.
Searl in this way has lost all flying discs which were started. By using solar neutrinos they presumably have fallen into the sun and burnt. The controlling should function analogous to a sail, then one would stand a chance, by "traversing" against the "wind", to sometime again come back to the starting-point.

<i>: H. Schneider, H. Watt: Dem Searl-Effekt auf der Spur, Special 7, Raum & Zeit Dokumentation aus dem EHLERS Verlag, 1. Aufl., Seite: 183

Start of a Searl flying disc



John Searl in his controlling headquarters

Fig. 18.6: The remote controlled flying discs of John Searl.[<i>]

<i>: Special 7, Raum & Zeit Dokumentation aus dem EHLERS Verlag, S. 152

18.6 Propulsion with neutrinos

In search for an ideal propulsion system for spacecrafts the flying discs of John Searl still have demonstrated a further possibility. After the start occasionally were left strange particles on the ground, which hadn't be there before. The flying device obviously had materialized them and dropped them at the start.

With this materialization of neutrinos the chance is showing of a very efficiently working recoil propulsion. If namely the neutrinos are converted into matter then they by that gain back their rest mass. If this takes place in flight then the materialized particles also bring along kinetic energy. It then works as ajet engine for which the direction of the jet can be directed and in that way the vehicle can be controlled comfortable.

In the case of the Searl-disc the materialization of neutrinos rather happens as a not understood side effect. In the case of a systematic use however the principle will show a characteristic property. Instead of a vapour trail a beam of light will shine out of the flying object in the direction of the emitted particles, but it will break off abruptly after a cartain distance.

To blame is the part, which has become anti-matter, which it is true as well contributes to the recoil, but simultaneously annihilates with incompatible particles of matter under emission of particles of light. If in some distance all antiparticles are used up then also the beam of light comes to an end.

It here concerns necessary properties of a corresponding propulsion technology for spacecrafts, which don't have to drag their propelling energy along with them. Our space technicians finally could handle another than the "hammer throwing method", in which case the "hammer" by means of terrible fuel consumption after a phase of acceleration only staggers uncontrollable through space under the influence of its inertia.

With a neutrino propulsion on the other hand one at any time can accelerate or brake. It will strongly influence the field around itself, so that can be reckoned that for every acceleration a field dependent change of size should be perceptible by an outside observer.

If therefore a corresponding flying device is accelerating then it will suddenly become smaller and that then looks so as if it would have moved away with a jump without temporal delay, but that isn't the case at all.

The jerky movements only would be a result of the perception with our eyes by means of the propagation of the light. Since the passengers are exposed to the same field, they change their body size along with that of the vehicle. They actually notice nothing of an apparently infinite acceleration, which only observers on the outside would observe and which indeed no living being could stand.

Nowhere the explanation crisis is larger than in space travel! The theory of objectivity represents a real help, because it perhaps as the only one puts us in a position to conceive and understand not understood observations as necessary technological consequences. Only by uncovering parascientific as purely physical phenomena man of today will be able to free himself from the constraints of magic and his own illusions.

Is the until now discussed cases resonant or other force effects are being used, whereas the gravitation remains unchanged. Closed field lines after all cannot be influenced, normally at least. Perhaps an indirect possibility exists to have an effect on the gravitation?

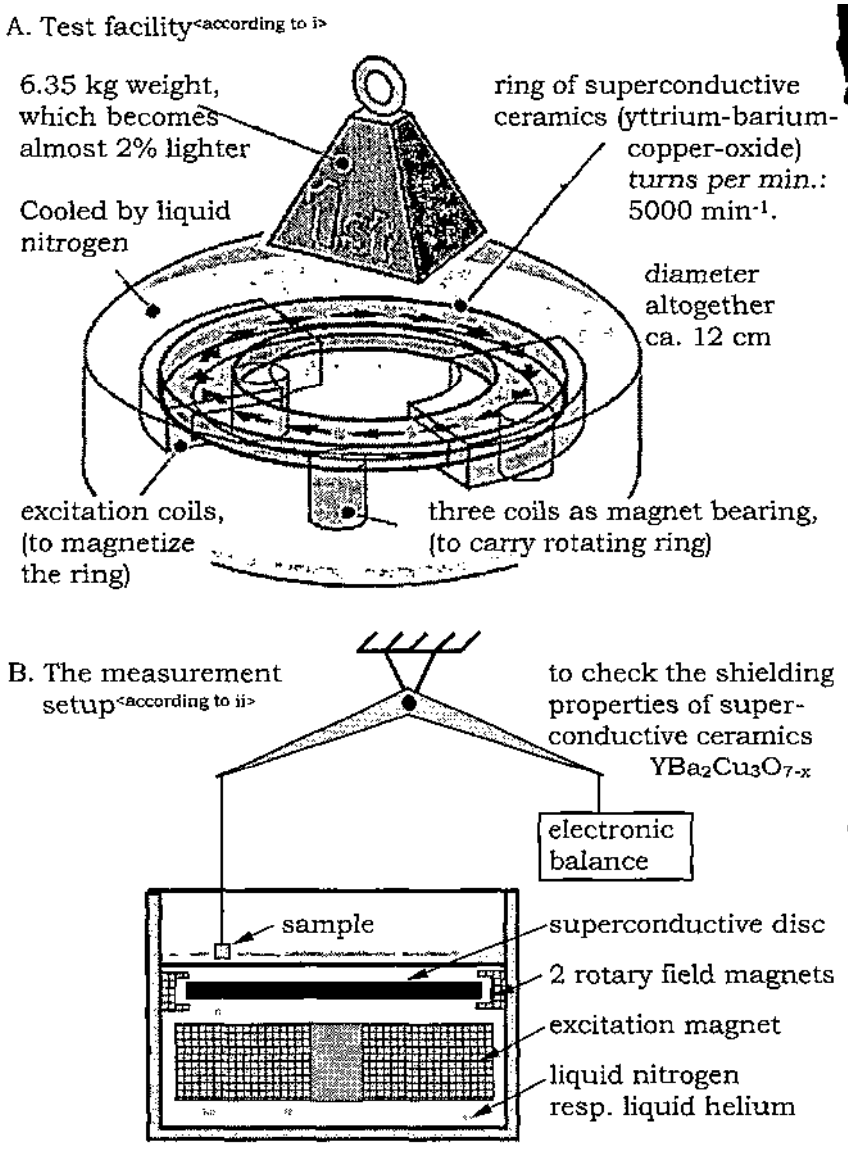

A. Test facility<according to i>
6.35 kg weight, which becomes almost 2% lighter
Cooled by liquid nitrogen
ring of superconductive ceramics (yttrium-barium-copper-oxide)
turns per min.: 5000 min-1.
diameter altogether ca. 12 cm
excitation coils, (to magnetize the ring)
three coils as magnet bearing, (to carry rotating ring)
B. The measurement setup<according to ii>
to check the shielding properties of superconductive ceramics YBa2Cu3O7-x
electronic balance
sample
superconductive disc
2 rotary field magnets
excitation magnet
liquid nitrogen resp. liquid helium

Fig. 18.7: Experiment for the manipulation of the gravitational pull of the earth.

<i>: Schneider: Anti-Gravitation im Labor nachgewiesen?, NET-Journal Januar 1997, S. 14,15; s.a. Internet: http://www.keelynet.com/gravity/fingrav.htm

<ii>: E. Podkletnov, R. Nieminen: A possibility of gravitational force shielding by bulk $YBa_2Cu_3O_7$-x Superconductor, Physika C 203 (1992), P. 441-444

<iii>: Force field Implications of Anti-Gravity, The Journal of Ideas, Art.191, 7.9.95

18.7 Antigravitation or levitation

The night already had fallen over Finland, but at the University of Tampere the light still was on. Then a scientist put his beardy head through laboratory door and with a "hello folks" blew the smoke of his pipe over the cryostat for the examination of superconductive materials. The scientists were speechless, because the smoke seemed to hit an invisible wall and was drawn upwards in direction ceiling almost at a right angle.
After having aroused the curiosity, Dr. Eugene Podkletnov also has held other materials above his rotating disc and had to discover that these as well lose weight, and that he actually influences the gravitation with his experiment. Even the air pressure at the corresponding place in a lying above floor was smaller[i].
With a superconductive disc of 30 cm diameter cooled by liquid nitrogen a reduction of gravity for 2% to 4% can be obtained, if the disc rotates with more than 5000 revolutions per minute. With the revolutions per minute also the effect increases, but it is independent from the excitating field[ii]. Finally the fields of the superconductive currents in the ring remain existing unchanged even after switching off the excitation and it only depends on these fields.

The shielding effect of the arrangement on electromagnetic fields already had been known before and should be examined closer in the laboratory. One only was surprised that the gravitation could be shielded as well, that obviously both interactions are related. According to the prediction of the theory of objectivity the closed magnetic field lines gravitate and the field components directed towards the centre of the earth cause the measurable force of weight. By the very strong superconductive fields obviously field overlaps and possibly a local driving out of field occurs, like one has long known for eddy currents (Meissner effect).
With that the earth gravitational field of course is not cancelled, but merely spatially moved, or it partly has changed its direction. If only a small part of field pointers turns out of their orientation towards the centre of the earth, then at that point the force of weight is reduced to a corresponding extent. The theory of objectivity requires that!

By the way reports exist, according to which even without rotation a weight reduction can occur for superconductive rings, and others, where is worked even entirely without superconduction. As core material for the ring ferrite or a strong permanent magnet is used. In that case depends on the circumstance that the ring-like coil is operated in self-resonance and always in the right moment again is excited anew by induction. The ring core then stores the fields up over time, exactly as the superconductor.
Stricktly speaking it are the atomic nuclei and in the end all elementary particles, which are aligning in the high field. Dr. Ning Li wants to artificially produce gravity, by directly influencing the quanta. With that she comes the phenomenon very close[iii]. The possibilities of this effect nevertheless are very limited, since two percent more or less are not exactly much, and the dream of the complete cancelling of gravity or even inertia possibly stays just a dream. It stricktly speaking just concerns influencing the gravitation and not antigravitation!

cause/ field lines	interaction F	= force effect *mediation:*	see chapter: effect/ *application*
5. closed **H**-field lines	gravitation (static)	F_{MG} = gravity *by particles with mass*	**chapter 6.9 + 7** elementary particle mass
6. closed **H**-field lines	levitation (dynamic)	F_{ML} = reduced gravity	**chapter 18.3** gravit. waves *Casimir effect*
7. closed **E**-field lines	gravitation (static)	F_{EG} (force hardly detectable)	**chapter 18.7** *supercon-ducting ring*
8. closed **E**-field lines	levitation (dynamic)	F_{EL} (no longer detectable)	**chap. 18.5 + 18.6** *Keely-/Searl-flying devices*

Table 18.8 A: The interactions of closed field lines.[i]

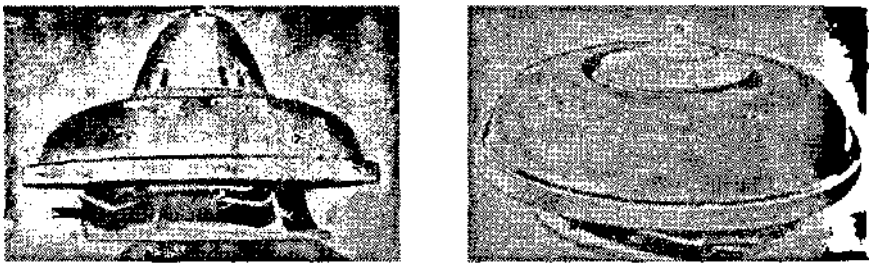


Fig. 18.8 B: Test models of the "flying saucer" according to Viktor Schauberger.[ii]

<i>: according to fig. 15.5, cases 5 to 8

<ii>: O.Alexandersson: Lebendes Wasser; W.Ennsthaler Verlag Steyr, 1993, S.103

18.8 Discussion concerning the effect of closed field lines

If we now direct our eyes exclusively to the lower half of fig. 15.5, in which the consequences of closed field lines are listed. Without the possibility of a direct focussing like for open field lines, the caused force effects turn out extremely small. With that they are less suitable for an use of free energy. The considerations in that context rather aim at technologies to reduce weight, like they would be worth striving for for flying devices.
If we allege that here in the same way the force effects of magnetic H-fields exceed those of electric E-fields for three to four powers of ten. Then it will hardly play a role for the force of weight of a body with or without additional electric charge, if its E-field lines are closed as well or are open. The increase in weight of an uncharged body only will have an effect in the third till fourth place after the decimal point. Seen so in the case of the gravitation it primarily concerns an effect of the magnetic field, more strictly speaking the effect of closed magnetic field lines (chapter 6.9).
If one succeeds in influencing these magnetic fields for instance by the influence of extremely strong fields of a superconductor, then also the gravitation will change, as has been shown (chapter 18.7). Let's imagine, in the case of a systematic procedure we would succeed in a perfect influencing, for which no component of the H-field lines points into the direction of the centre of the earth anymore, then an uncharged body would only have one tenthousandth of its original weight, whereas a charged body actually would weigh nothing anymore. This state of the weightlessness supposes that all E-field pointers point into the direction of the centre of the earth or diametrically in the opposite direction, since E- and H-field are standing perpendicular to each other. Unfortunately such a field distribution technically hardly can be realized and so the ,,flying carpet" furthermore remains reserved to the fairytales.
An effective reduction of weight of planes and other flying objects however seems by all means feasible, and so slowly the number of research facilities increases, which more or less officialy have a critical look at the cancelling of gravity and the levitation. The theories on which they are basing, however often sound very bizarre and moreover are completely unphysical. Maybe a look at the distribution of field lines, as proposed here, helps to get further.

In the case of the levitation, which occurs strictly speaking only in the case of oscillation for closed field lines, resonance again plays the crucial role for the coming about of the interaction. In connection with neutrinos the resonance can serve less the collecting; we rather need it for the materializing, for the production of mass, charge and energy.
For the artificial production of a levitation either a mechanical oscillation in the atomic or molecular domain is needed, like for instance is produced by a rotating water molecule, or a resonant oscillation of size takes place by use of electrostrictive or magnetostrictive materials, like piezocrystals or oscillating quartzes.
In this context surely is of great importance that also the temperature could be identified as a particle immanent oscillation of size (chapter 8.3). That's why besides a cold materialization or cold fusion also exists, at least theoretically, the possibility of a hot materializatin or hot fusion.

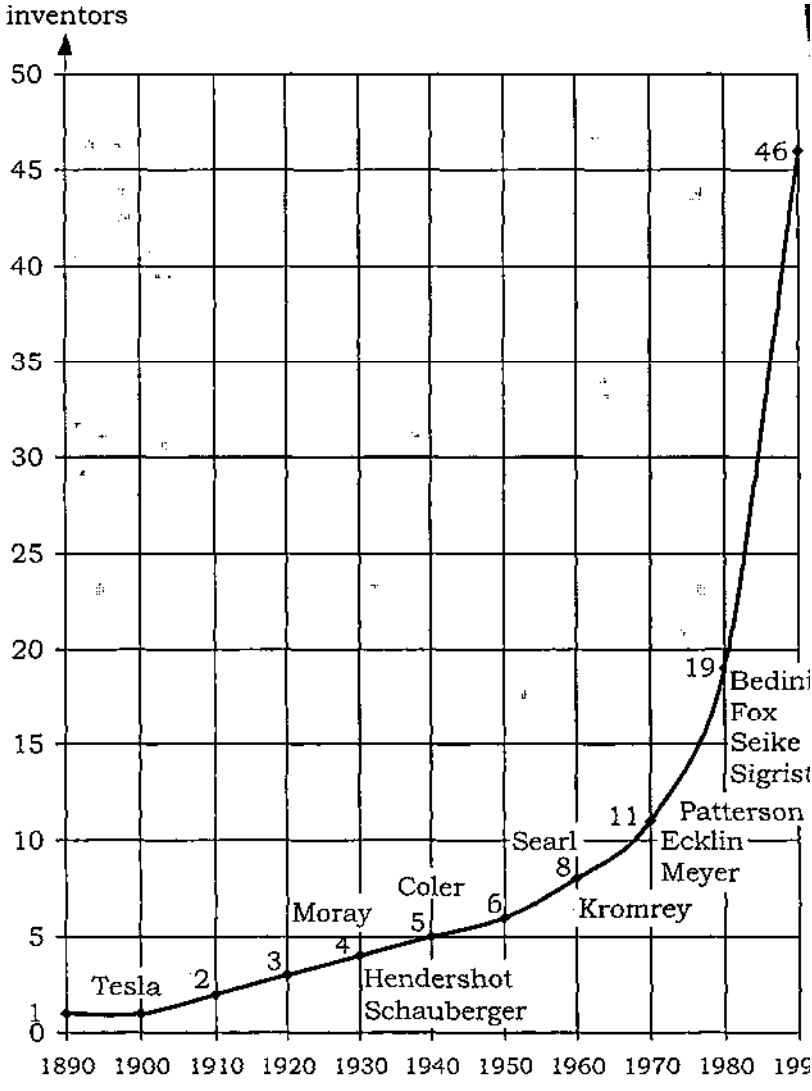


Fig. 18.9: The increasing number of free energy inventors.[<i>]

<i>: only the inventors mentioned in the text are entered. Literature for that: A. Schneider: Energien aus dem Kosmos, Jupiter-Verlag (1994), S. 77

18.9 Concerning the determination of the stand of today's energy technique

An analogy to the production of matter forms the production of light. At high temperatures as is well-known is formed thermal light and at low temperatures cold light, the discussed luminescence. An oscillation of size of the light source in all cases of the formation of light is the cause, be it as an electromagnetic wave or as photon vortex, be it in whirled water or as sonoluminescence. We at last see ourselves put in a position to understand the various light phenomena as something which is related.

The call for new energy carriers and an ecologically compatible energy technology can't be ignored anymore. The number of inventors at present increases fast (fig. 18.9). It is legitimate and worth recommending, to observe for this purpose first of all nature, how it solves its energy problem. Doing so we should realize that in contrast to the technology of today no combustion and no explosion takes place, but rather principles of a cold fusion and of an implosion as a result of contracting potential vortices are being used. Actually nature may point the way out of the energy technical dead end. We only have to accept the offer, be open and show being ready, to invest in the development of methods in accordance with nature.

Directed at the address of the distributors of supporting funds for energy research the claim in plain English reads: to grant no money anymore for ecologically harmful concepts, like nuclear fission or for not understood and not realizable developments like hot fusion. to immediately stop the fruitless works and to provide the money for an ecologically compatible energy research.

Immense saving potentials moreover are found in all domains of physics, where instead of costly experiments just as well the things could be calculated with an usable theory. To check the theory then only few experiments would be necessary. After all all important discoveries have come about in this manner. Nobody should think, he had understood a matter, once he has filled himself up with sufficiently much measurement data.

The root of the evil lies already in the education, where students of physics want to understand everything and therefore are trying hard to grasp with their view and hands for everything. Abstract thinking or mathematical derivations however are too uncomfortable for most; they have the erroneous opinion, understanding (German: begreifen) would have to do more with grasping (German: greifen), and for that the head after all can't be used.

One reason for this development can be seen in the relativistic point of view of Albert Einstein, who proceeds from the assumption of a subjective observability and has raised the relativity between a physical principle and the observation to the basis of physical thinking. The arrogant motto prevails: what I can't observe with my sense organs or register with corresponding gauges also isn't physics, but esoterics or parascience.

But if we want an ecologically compatible technology, then this can't be reached with this point of view. Then we only hinder ourselves with our own arrogance and intolerance. We have to leave the erroneous quantum physical way and again learn to think abstractly by taking up tried and tested principles of classical physics. An objective point of view forces us to register the phenomena, which lie outside the observable range, with mathematical MEANS (see chapter 13). Only if we have learned that, we will understand and realize the true relations in physics!

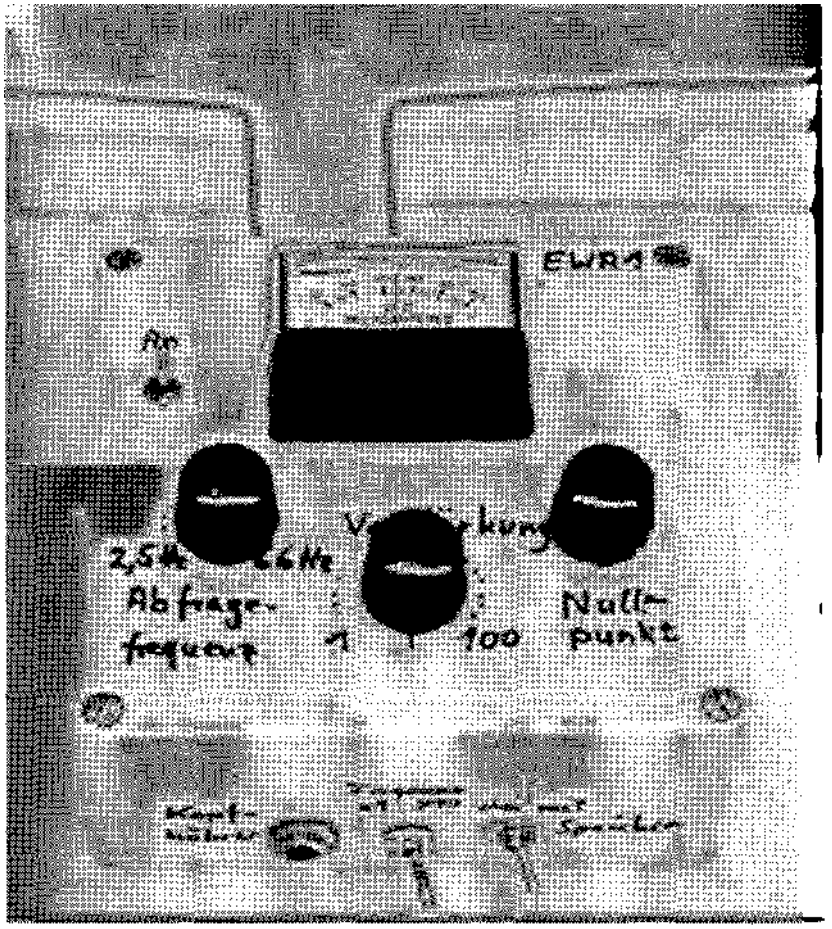


Fig. 19.1: A self-built charge amplifier.

19. Own experiments

The opposite of the theoretical considerations form practical experiments. If we want to register and understand physical and natural scientific phenomena, then we shouldn't entirely forget the aspect of handicraft. Doing so it can't be avoided that it goes on very personally, if about the laboratory work is being reported, not even then, if the experimenter is at pains to exclude every influencing of the carrying out of the experiment and the result. After all does anyone have to execute the experiments himself, since a good sceptic anyhow only believes, what he has observed with his own eyes.

19.1 Concerning the rating of experimental physics

There already have been scientists, who have requested to reject a measuring technical determined result for the case that textbook physics doesn't produce it. This attitude even today still is taken by an uncounted community of believers of science, entirely after the motto: "Nature kindly has to fit in with the dogmas of theoretical physics!"

This wrong thinking is reflected in the scientific journals, which reject to print discussions. Controlled by a tester board, which only has the task to prevent dissenters from the publication of their ideas, they are the sad proof, how widespread this erroneous attitude today is in the university scene.

Actually solely the scientific experiment shows us the physical reality! The theoretical models, like the here presented vortex model merely should help to understand nature and its laws. The representatives of theoretical physics are in the role of a helper and that requires modesty and openness.

For the case that a professor of theoretical physics imposes a pledge of secrecy on an experimenting colleague, if this one wants to report publicly about his amazing tunnelling experiments, then the public nevertheless should have the right to find out, if a tunnelling experiment reveals speeds faster than light, even if it doesn't suit the theorist and he in inappropriate arrogance only should consider the experimental physicist as his assistant.

If universities only are occupied with preservation of property and the industry only with the increase of its productivity, if future research consists of hiding public research funds internally in such a way that nobody realizes the fraud of support and in reality nobody thinks of the future anymore or wants to work for it, then we will be able to observe how discoveries and inventions migrate from the industry and the universities with their controlled central organs and increasingly will take place again in garage, cellar, solitary study room or in privately organized circles.

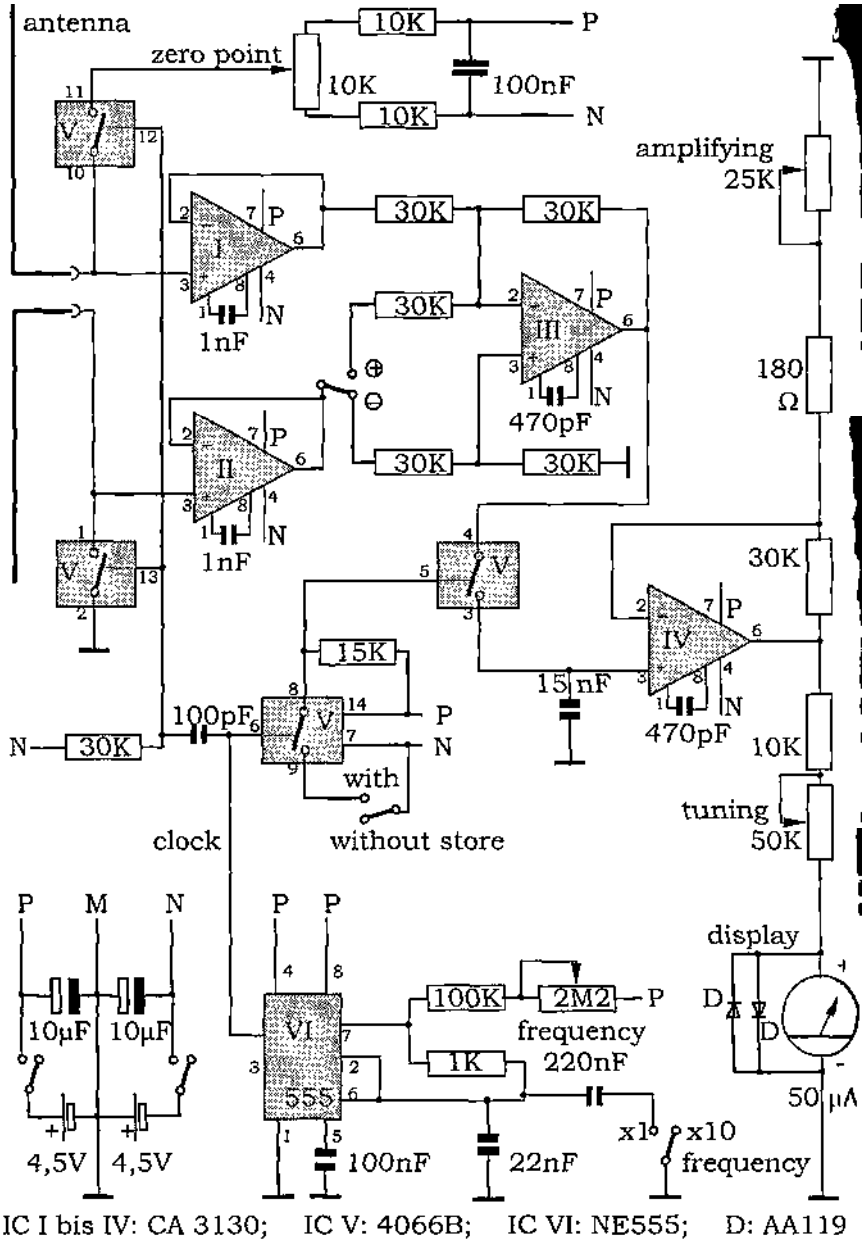


Fig. 19.2: Wiring diagram of the self-built charge amplifier

19.2 The charge amplifier from the workshop of handicrafts

Is connection with my vortex theory in this book time and again clues to experiments can be found. I am aware of their importance and I always, to verify my theoretical working out, have accompanied it with practical experiments. Doing so not the proof, which can be published and reproduced by anyone at any time, stood in the foreground. With the experiments in my workshop of handicrafts I only wanted to check for myself, if my derivations still can be verified.

Consequently was at first done without a publication in the first and second edition of the second part concerning the "electromagnetic environmental compatibility". For the addition of the here presented chapter about own experiments from the third edition there are several reasons: first; I have been asked for it by several readers, second; from every experiment is coming a piece of physical reality to meet one and third are here latent some useful ideas and approaches which get us somewhere.
Of course can't be read much from a handicrafts self experiment, but perhaps one or another reader, who has better laboratory technical possibilities at his disposal than me, is stimulated to carry out own experiments.

To chase after the potential vortices in the air, I 1989 at first have built together a charge amplifier. I connected differently formed antennas at the particularly high-ohmic difference input. Corresponding the in nature arising static electric field a tension voltage should arise between both antennas, which my gauge should amplify and indicate on a moving-coil instrument.
To be able to register local changes, a measurement cycle is gone through, which periodically is repeated: It starts with the measurement time, during which entirely by itself between both antenna a charge is building up. The value afterwards is stored analogue in a Sample-And-Hold link and displayed by means of a moving-coil instrument. Then the input clamps are short-circuited, the antennas again discharged and the game starts from the beginning.

Measurement time, zero and amplification can be adjusted at the device (fig. 19.1). Whoever has fun to rebuild it, finds the by me realized wiring diagram in fig. 19.2.

It is true I did realize other designs, but technically the here shown design proved to be the most useful solution.

Fig. 19.3: _____The bath tub drain vortex;
shown is a tidal vortex near St. Malo.<i>

<i>: Photograph from the magazine „Life" of 4.7.1969, resp. from: H. J. Lugt: Wirbelstromung in Natur und Technik, Seite 371

19.3 Interpretation of the observations with the charge amplifier

The practical use of the device at first proved to be extremely difficult, because the pointer seemed to perform a wild dance. At a more close look I however could make exactly those observations, which I had sought-for as proof for the existence of potential vortices.

First I did find confirmed the known high field strength. We after all live between the ionosphere and earth's surface right in the middle of the dielectric of a "spherical capacitor". Because the values of the electric field reach very much closer to the maximum value, which is lethal for living beings, than the value of earth's magnetism, I did draw from that the conclusion that biological effects primarily can be expected from the E-field.

If the E-field, as Maxwell's field theory specifies, actually would be irrotational, then we would be dealing with a gradient field. My device would have to display everywhere to a large extent the same value. But that was not the case.

Maybe the building is responsible for the chaotic display and the wild swings of the pointer, so I thought. Doing so I had thought of the auxiliary explanations of the high-frequency engineer about so-called reflections in closed rooms. Therefore I stormed with the gauge, which had gone wild, into the open air and walked different ways, which should have been reflection free, but the picture stayed the same. In any case the E-field is not a gradient field. I had to find out.

Following I could, what required much patience, find certain places, at which for the same movement from the same direction could be seen a reproducibility of the swing of the pointer, it even could be arbitrarily often repeated. 1 marked the point exactly. Then I tried to move the device from another direction towards the marking and had to find out that the point had moved away.

If I sit in the bath tub in the evening and pull the plug, then I each time am enthusiastic about how sensitive the drain vortex reacts, how I can send it from one corner into the other by the snipping of a finger without it falling apart (fig. 19.3). Doing so one easily can imagine with a bit of phantasy how difficult, yes, almost impossible it would be to measuring technically register the vortex for the case that we could not see it. The gauge it is true would display violent wave movements. But a reproducibility we would not be able to obtain, exactly as for my self-built charge amplifier.

Now I knew that the by me at 2.1.1990 at first purely theoretical derived potential vortex actually exists as vortex of the electric field!

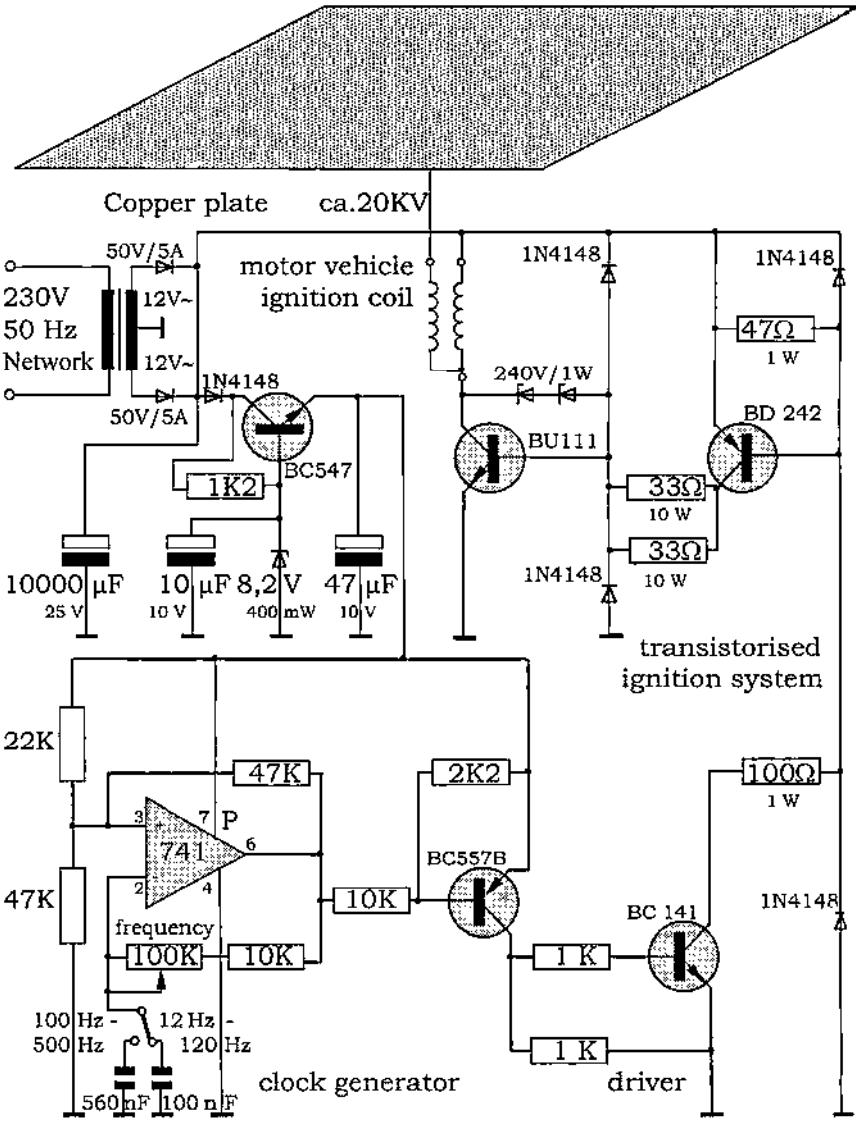


Fig. 19.4: Wiring diagram concerning the Kirlian device.<i>

<i>: Elektor, Fachzeitschrift fur Elektronik, Mai 1977, S. 22-25: KirlianfotogralV

19.4 High-tension experiments in the laboratory for performance electronics

At first the students of electronics, with which I had to do daily, were infected by my discovery. With true enthusiasm they soldered together one circuit after another. In my laboratory something like a mood of setting out could be felt. One student brought along and old ignition coil of a motor vehicle, then the control circuit for it was built, plexiglas organized, an aluminium plate glued under it and the whole box dragged into the photographical laboratory[<i>]. Three students made a detour along the outside grounds of the polytechnic and picked the necessary visual aids of trees and bushes.
Following the leafs were laid on photographical paper and by means of the self-built high-tension generator charged to 20000 Volt. Doing so at all edges and particularly at the tips of a leaf corona discharges arise, which expose the photographical paper. We then developed the photographs ourselves and discussed the results [<ii>].

The indication, for a second photograph the whole leaf would appear even if half the leaf is torn apart after the first experiment and only one half is put on, occupied us in particular. Eventually we didn't put on a leaf at all in the second experiment and found out that nevertheless the leaf put on last became apparent on the photograph. Now only one physical interpretation was possible: The potential vortices of the leaf stimulated by high-tension still were in the plexiglas disc in weakened form! Here they swirl further and under high-tension furthermore produce corona discharge impulses.

Now also the students were convinced of the existence of the potential vortices.

This experiment stimulated the brain cells of the entire team: If potential vortices under high-tension cause electric blows, since the corona discharge is nothing else, then in this way the local vortex distribution in space should be measurable? One student immediately got down to work and build from the horizontal diversion unit of an old television a high-tension generator with an adjustable spark gap. Following he walked with his flashing and crashing device all through my laboratory and others walked with him and dragged the gauges behind them. But to their big disappointment they were not able to see an influence dependent on place.

Then it suddenly was clear for me: It would have done the students well, if they before would have had a bath and observed the drain vortex, "it suffices the famous wing stroke of a butterfly", I explained my team, "and instead come up with this infernal machine and chase away all the vortices, which we actually want to register ". We had to realize that as a rule phase of disillusionment follows the euphoria.

<i>: Klektor, Fachzeitschrift fur Elektronik, Mai 1977, S. 22-25: Kirlianfotografie; fig. 19.4 shows the wiring diagram and fig. 19.5 A the self-built device.

<ii>: The Kirlian photographs from the darkroom of the polytechnic are shown in fig. 3.6.

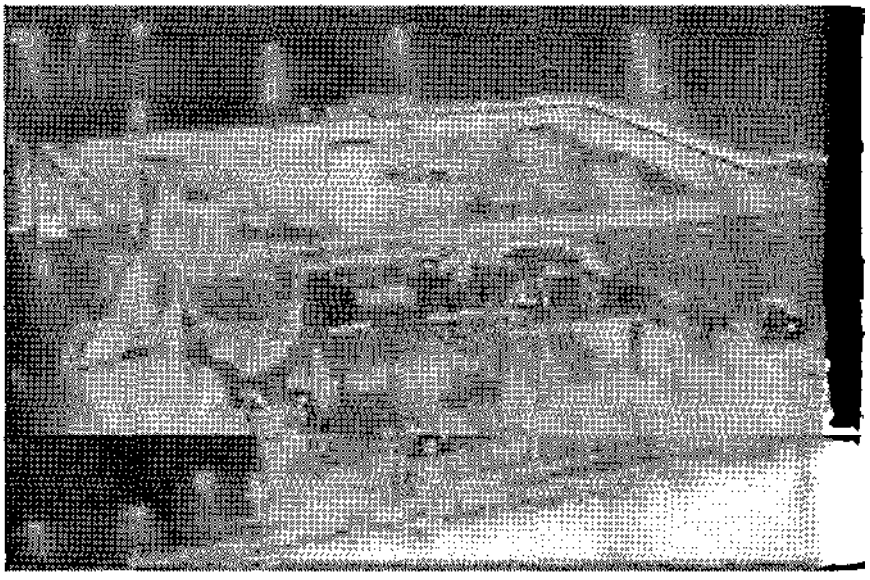


Fig. 19.5 A: A self-built high-tension device for Kirlian photography

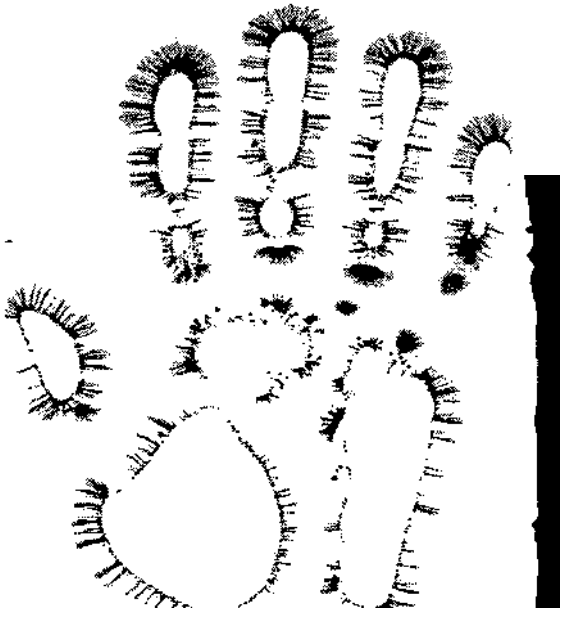


Fig. 19.5 B: Kirlian photograph of the right hand

19.5 Measurement of dielectric capacitor losses in the HF laboratory

My convincing work clearly was shaped more complicated with my professor colleagues. Most pretended to understand nothing about it and kept themselves out. But there also are exceptions. ,,something like that has never been there at our polytechnic, that a colleague puts forward an own field theory ",a physicist colleague remarked after my lecture public to the polytechnic<i> at 3.7.1990 and meant, that must be celebrated. He festively let me cast my eyes in his store room, got out a few bottles of wine, which then some of my colleagues of physics emptied with me in their official room. Doing so we small talked about the sense or nonsense to fix on the education of physics to the Coulomb charges.

The head of the high-frequency laboratory showed likewise impressed. At last he now knew, why capacitors at microwave frequencies can become so hot that they solder themselves out of the circuit by themselves and can fall out, why PVC-films can be welded with HF, etc. ,,We have to prove that not the dielectric is to blame, as stands in the textbooks" he came towards me.
At least following my idea potential vortices are the ones, as I expressed myself, which are behaving dual to the eddy currents. It concerns vortex losses, thus a physical phenomenon. Eddy currents now can be damped as is well-known, by for instance sheeting the iron circuit for engines and transformers. The insulation between the sheets prevents the formation of eddy currents in that direction and the degree of effectiveness increases.
"I would suggest", I told my colleagues, ,,to "sheet" a capacitor in a dual manner and to measure the losses". Because eddy current losses increase with the square of the frequancy, we picked microwave frequencies. In the HF-laboratory a card with an L-C resonant circuit was made, we should be able to quite precisely determine the losses by means of its quality. The inductance was formed as a microstrip line and for the capacitor a socket was planned.
The carrying out of the experiment consisted of using single layered ceramic capacitors, so called trapezium capacitors, with a vapour deposited silver coating on both sides as a package and to measure the quality of the resonant circuit as a measure for the dielectric losses. According to the rules of duality the dielectric (as nonconductor) thus corresponds to the permeable transformer sheet (conductor) and the silver coating (conductor) to the sheet insulation (nonconductor). In a second experiment the silver coating now was removed and the same capacitor material measured at identical conditions this time uncoated. Will the losses increase or isn't changing anything?
Tension and nervousness suddenly could be felt, even among the students, who followed the experiment from the second row. All looks were pointed at the monitor of the network analyser, on which slowly the bell-shaped curve of the measured resonant circuit quality became apparent. The result was surprisingly clear. I first looked at my colleagues and then at the students and had to realize that all eyes were pointed at me. The first measurement was a bull's eye! The vortex losses "uncoated" were considerably larger.

<i>: K. Meyl: Die mangelnde Dualitat der Maxwellschen Gleichungen with contributions concerning the theme of magnetic space poles, the mathematical calculation and the technical-physical interpretation of newly discovered potential vortices. Invited by the rector of the FH Furtwangen at 3.7.1990

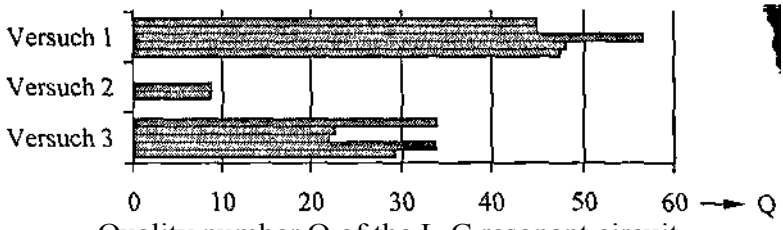
- experiment 1: quality of resonant circuit with coated capacitors
  from a series of 5 separate experiments averaged: Q = 48
- experiment 2: silver coating removed with diluted nitric acid
  possibly the acid has damaged the dielectric: Q = 9
- experiment 3: silver coating polished off mechanically.

low quality means high dielectric losses! averaged: Q = 28

- resonance sharpness (quality number):

$$Q = \frac{f_0}{\Delta f} \quad \frac{\text{(Resonance frequency)}}{\text{(Resonance frequency ran}}$$

at a resonance frequency f0 of approx. 400 MHz.



Quality number Q of the L-C resonant circuit
the dual ,,sheeted" capacitor has the lowest losses,
the resonant circuit with that the highest quality (experiment 1).

Fig. 19.6: Measurement of the dielectric capacitor losses over the quality of a resonant circuit in the HF laboratory at 11.06.1990.

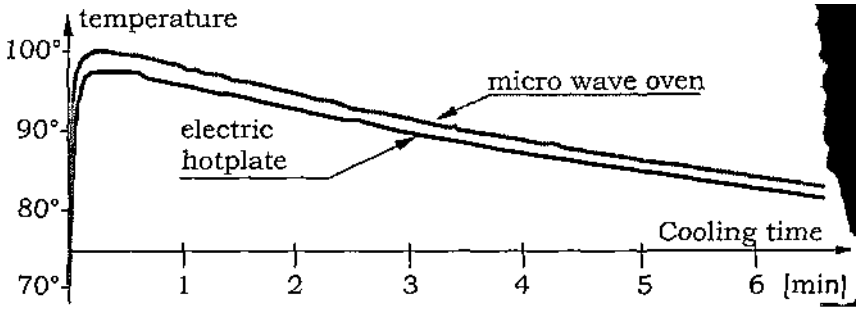


Fig. 19.7: Measurement curve of the water temperature over time
at 22.10.1996 in the electrical engineering training
Observation: for the microwave oven the container despite the "after cooking-effect"
remains colder than in the case of a hotplate. Sensor: PT 100.

19.6 Analysis of the measured capacitor losses

First of all the colleague spontaneously prompted a common publication.

But a certain disillusionment had to await us. For the next measurement hardly a differemce could be detected. We varied the contacting and removed the silver coating. once with hydrochloric acid, once with fine sandpaper. Every measurement we repeated umpteen times and in the end had to draw the conclusion that the results for our somewhat unprecise construction fluctuated extremely.

Averaged over all measurements and methods, indeed a reduction of the dielectric losses for alayered capacitor resulted, but at a critical consideration of the errors the results seemed to "drown" in the mean variation. In the opinion of my colleague the visible trend wasn't sufficient to convince dyed-in-the-wool sceptics, whereupon he withdrew with the indication, I should try at the people of microelectronics, they more likely would be capable to reproducibly gain control of a layered construction.

The experiment at least let a legitimate chance open that the vortices of the electric field actually exist, and in the case of the delectric losses of a capacitor it concerns vortex losses<i>.

19.7 Microwave oven for testing in the laboratory of electrical engineering

"Volunteers first" was said at 22.10.1996 in the electrical engineering practical training and two students got down to work. I had brought along from our kitchen the microwave oven, a portable immersion heater, a kitchen stove plate and different containers. In the laboratory of the polytechnic I in addition had got hold of a Bunsen burner. In the sense of the "Stiftung Warentest" (institution to protect consumers in Germany, note of the translator) it concerned the question for differences in heating water; or following the public discussion, is cooking with gas more healthy than cooking with the microwave oven?

We wanted to know. So we cooked water, filtered by inversion osmosis, once with the gas burner. once with the hotplate and finally with the microwave oven. Switched off always was at the same moment at the same temperature, and the cooling down curve was recorded with an x-t-time recorder (fig. 19.7).

Between gas and electric cooker virtually no difference could be detected, but the microwave oven at switching off still showed an odd temperature increase. I already had remarked this earlier. If one takes a water glass out of the microwave oven, then the water again really bubbled off, although the container itself had remained relatively cold. If one on the other hand takes a water pot off the gas cooker, the water suddenly stops cooking. From where comes this difference, which also the experiment could confirm?

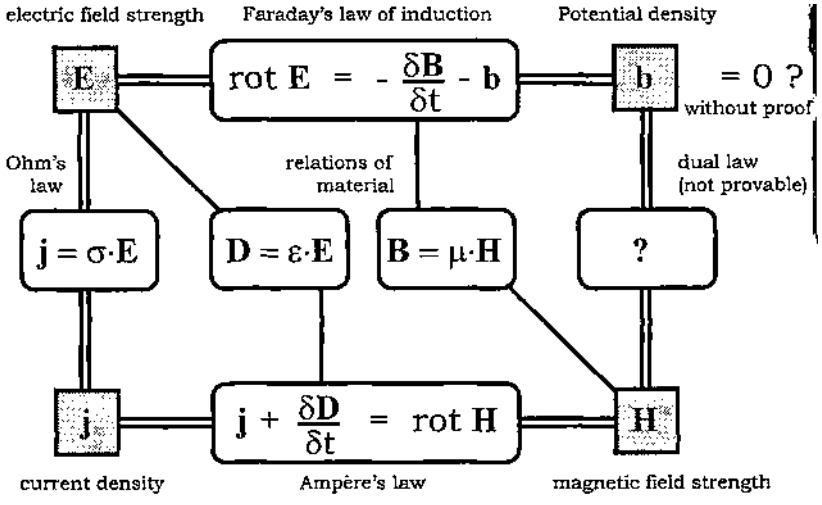
<i>: A result of my dual way of looking at the vortex losses is the representation in fig. 4.7.

A: damped wave equation:

$$\Delta E\, c^2 = \delta^2 E/\delta t^2 + (1/\tau)\cdot\delta E/\delta t$$

(wave) + (vortex)

B: open chain of reasoning in the physics of electromagnetism:



C: for the stationary case $(\delta/\delta t = 0)$ in general representation:

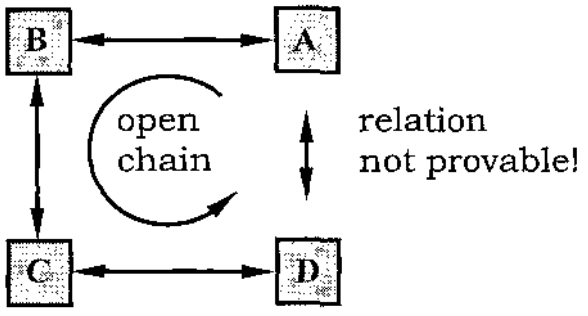


Fig. 19.8: ____ Contribution to the discussion about the impossibility, to prove, according to scientific methods, in a chain of reasoning (A-B-C-D) the last link (D-A), which closes the chain.

19.8 Microwave heating by decay of vortices

It has to concern a storing effect. In the case of an normal cooker the heat transfer takes place by convection. In the case of a microwave oven we however are dealing with an electromagnetic wave.
But in the wave equation nothing can be read about heat; here merely vortices can be found as a damping term (fig. 19.8 A)<i>! Therefore as the only possible interpretation is left that the microwaves roll up to vortices to fall apart themselves after a certain time.
Only at the vortex decay heat is formed.
The irradiated microwave power according to that is stored over a longer period of time as vortex in the water and the food. The vortex decay takes place according to an e-function with the calculated relaxation time constant tau<ii>.

From the circumstance that particularly water is heated up in the microwave oven despite the small electric conductivity but with high dielectricity, I infer that it has to concern mainly potential vortices, from which a biological effectiveness can be expected. The question if this should be valued positively or negatively, I have to leave up to the doctors and therapists. At least physically seen a difference is measurable. Thus a vortex decay will occur for a meal prepared in the microwave oven even if we already have consumed it.

Conclusion: I wish all: your health!

But what do I write about vortex losses, if every sceptic knows half a dozen alternative interpretations. Inevitably I have to bear in mind that also the eddy current heating owes its acknowledgement only the circumstance of the discovery of the corresponding laws. If Othm hadn't discovered his law and formulated it in the known form and instead the dual formulation would have been discovered, then we today would attribute the dielectric losses in a capacitor and in the microwave oven to the potential vortices, in the case of the transformer however the material would be responsible for the heating and not eddy currents, for which there then also wouldn't be a theory (fig. 19.8 B).

It actually is pure coincidence that at first Ohm's law and not the dual formulation had been discovered and acknowledged. But because both are equivalent, we also have to assume the correctness of both, even if the last link of a chain of reasoning A-B-C-D back from D to A in principle can't be proven anymore, since it already is explained by the chain A-B-C-D (fig. 19.8 C).

There I thus had discovered a potential vortex, without a possibility for a direct proof of existence. For that the textbooks are full with auxiliary explanations, with which physics successfully cheats past this important field phenomenon. I was frustrated. There had to be a way to measuring technically register the vortex in some way.

<i>: Fundamental field equation 15 in fig. 5.1 or equation 21, fig. 5.3
<ii>: Relaxation time constant: see equation 10 in fig. 5.1 or fig. 8.1

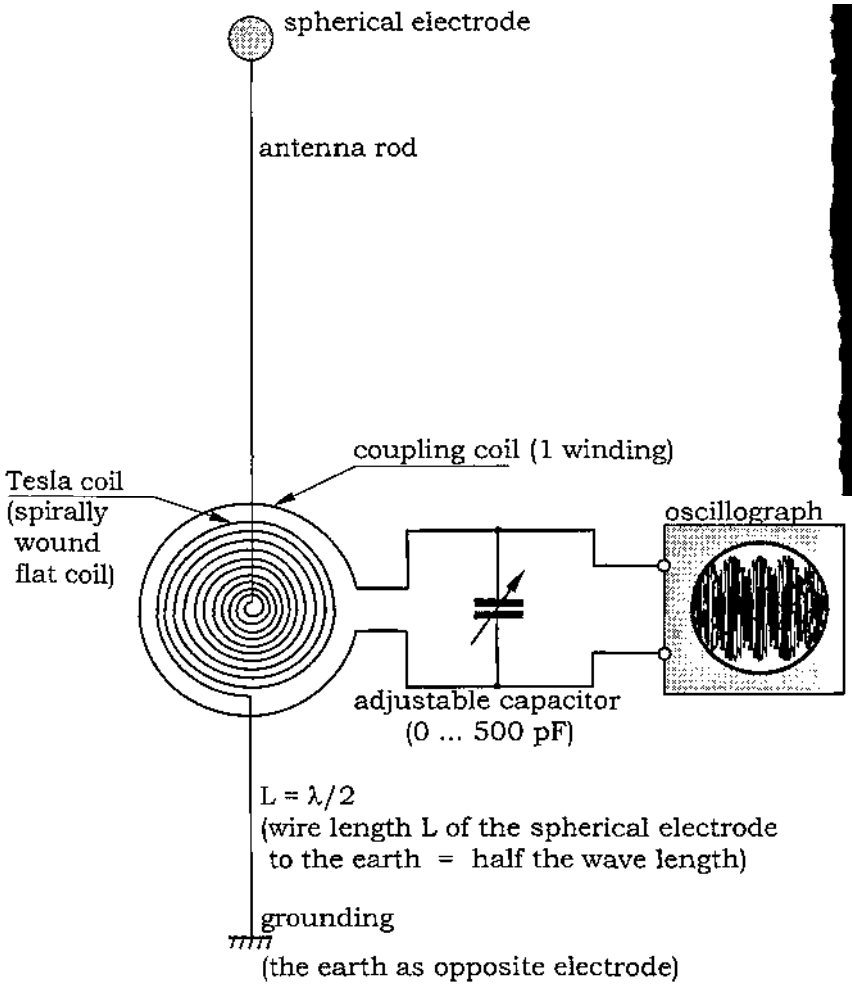


Fig. 19.9: Proof of scalar waves with the Tesla coil.<i>

<i>: The inverse use for a high-tension transmitter according to fig. 9.1

19.9 The Tesla coil from the workshop of handicrafts

I again retired in my workshop of handicrafts and wound flat coils or I pondered in my study over Tesla books. 1995 from several sides my attention had been drawn to the circumstance that the inventions of Nikola Tesla can be organized in three categories:

The first third has made him world-famous. It concerns the rotary field theory, the asynchronous engine and the today normally used alternating current technology, which we owe him.

The second third concerns technologies and inventions, which were rediscovered by other people partly only years later or even were only pinched and distributed as novelty under another name. Electron microscope, superconduction, electrolyte capacitor, fluorescent lamp, fuse. coaxial cable and a lot more count among that.

The last third however concerns inventions, which until the day of today still aren't understood and await their scientific explanation and technological use. Tesla himself called these achievements his most important inventions, but still owes us a scientific explanation. The scientific world also hasn't got a theory ready and doesn't know to do anything with it. Public research doesn't take place or is prevented by lobbyists.

What remains, are tinkerers of various educational background and qualification, who are trying hurd to comprehend the buried experiments of Nikola Tesla off their own bat in the garage or in the hobby cellar.

I felt like one of these, by winding one winding after the next from the inside to the outside. Then I soldered an antenna wire at the inner end of the flat coil, which I in Tesla manner connected electrically with a spherical electrode hung up under the ceiling. The opposite electrode should be connected to the outer end of the winding, it is said, and the distance between both should be as big as possible. If namely an electrode just is collecting, then the opposite electrode is repelling the same space quanta. According to Tesla's recommendation I did use the earth as opposite electrode and for that tapped the central heating or the grounding of the foundations.

To take signals only one to two windings as secondary winding were necessary. I connected them with an adjustable air capacitor from an old steam radio to a frequency determining parallel resonant circuit and looked at the taken tension voltage at the oscillograph (fig. 19.9),

I still had problems with the statement of Tesla, the coupling had to be made loose. Thus the question is asked, how loose? I after that organized two toilet paper rolls of different size, (after the toilet paper had been used, naturally) and pushed them into each other. The smaller toilet paper roll carried on the gable-end the flat coil as primary winding of the air transformer and the bigger one the coupling coil. Now by shifting any wanted degree of coupling could be adjusted to (fig. 19.10).

I was astonished myself. Tesla actually was right with his discovery of the scalar waves. With my arrangement they can be clearly distinguished from the Hertzian waves.

The following procedure is recommended:

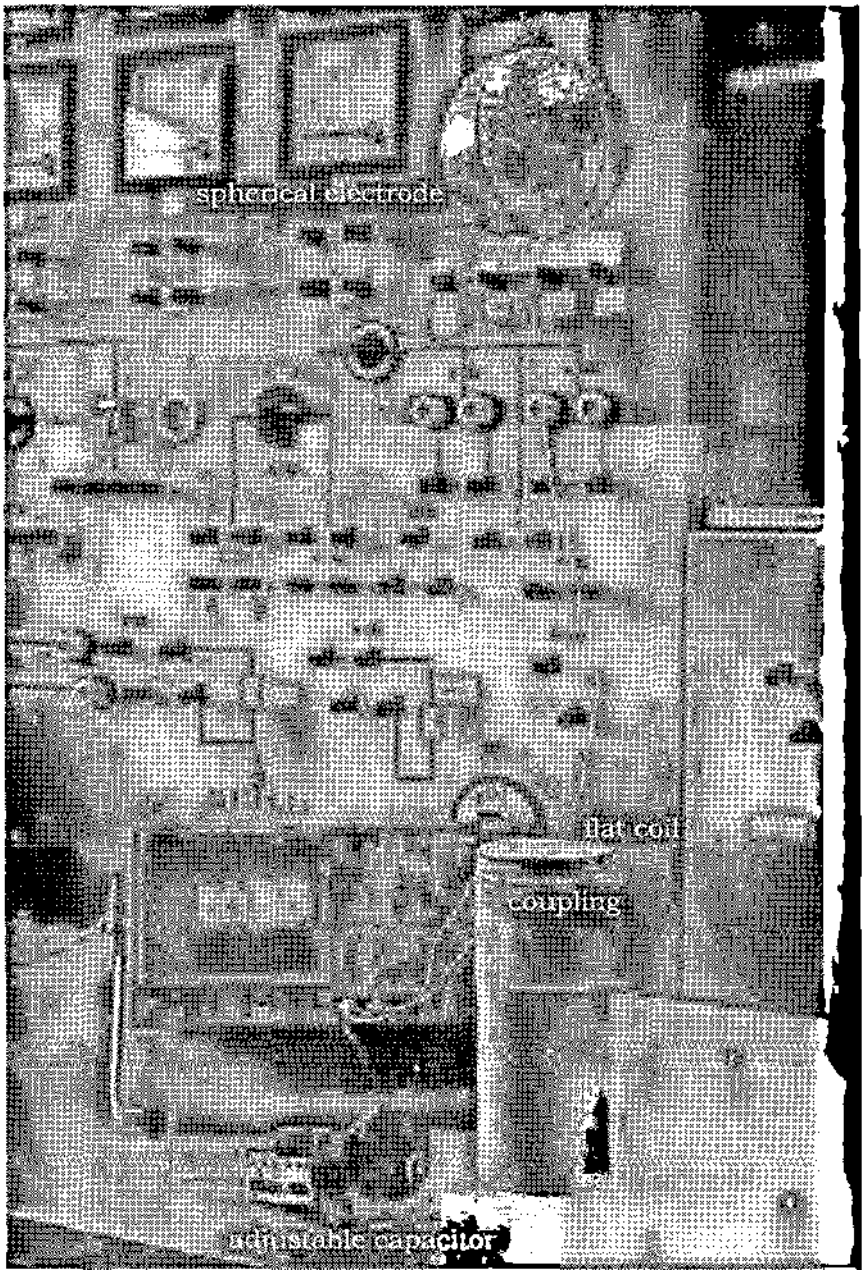


Fig. 19.10: The experimental configuration

First of all I seek a source of interference with the adjustable capacitor and tune to maximum amplitude. Then I change the coupling and further optimise in this way. If now the amplitude again decreases from a certain point while approaching the coupling coil, then it concerns the sought-for longitudinal waves. If namely the coupling is too tight, then the received vortices again are driven away by the effect back on the fiat coil. They make way.
At last I had found a method to catch the vortices in such a way that they not immediately "ran away" from me again. At once I presented them in the technology centre in St. Georgen. In the time following I improved the technology further and further, used bigger toilet paper rolls and eventually even turn up garbage cans, I varied wire length, wire diameter and the sense of winding (fig. 19.10).

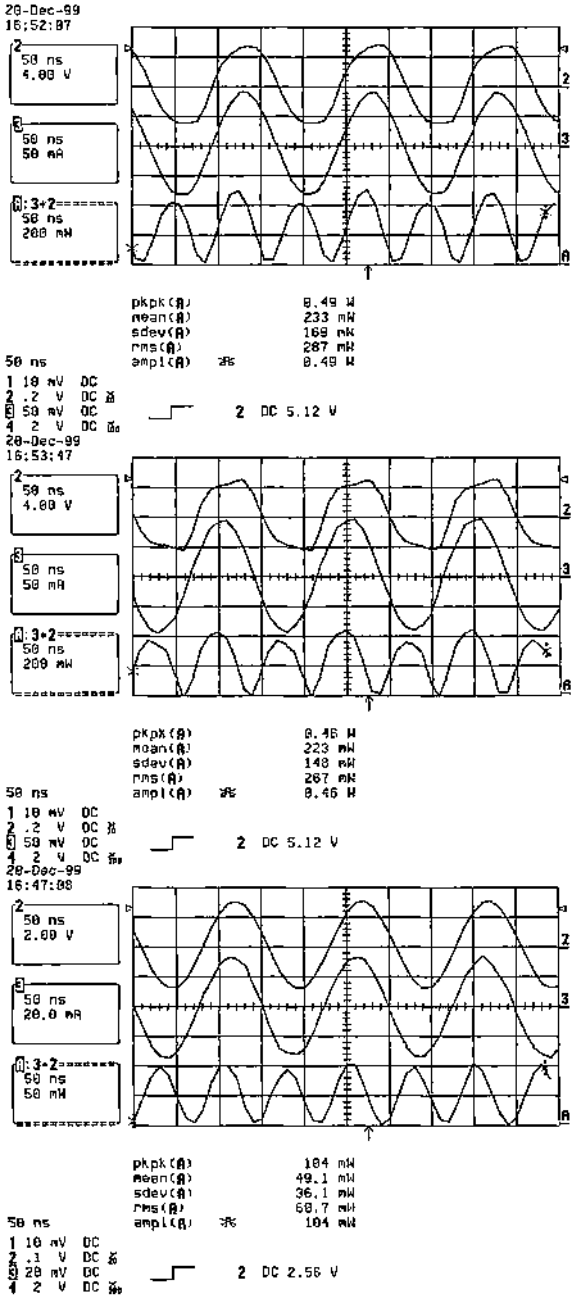
I had very different success. Sometimes, if at the same time in my workshop of handicrafts the radio worked, it would look as if the received signal would synchronize with the sound waves. Both are longitudinal waves after all. With transverse waves something like that would be unthinkable.
One moreover could observe, how a resonance builds up: first slowly and then faster and faster, so that I sometimes got terribly afraid. Several times we had to repair our oscillograph, after the protective diode at the input amplifier had blown, and that for signals of 50 to 100 millivolt!
That was entirely impossible. Only individual spikes, which were too fast to be seen at the screen, could be to blame. In the case of distant thunderstorm activity I obtained maximum values of more than half a Volt. After that I undamped the grounding as fast as possible, so that no lightning would be caught, since I didn't have the intention to burn off my workshop.

19.10 Biological effectiveness of the Tesla coil

Also the biogical effectiveness of the Tesla radiation I could impressively prove with this device. 14.06.1997 a woman, who called herself extremely electrosensitive, participated in the weekend seminar about electrobiology, which I took over from Prof. H.K. Konig (TU Munich) after his death. That I wanted to test.
I hung up my device in the lecture auditorium and installed the oscillograph in such a way that all could see it. The voluntary test subject however could see neither the public nor the screen. One person every 5 seconds said "now" and the female candidate should say, if I had clamped or undamped the grounding, if therefore scalar waves were received or not. After a training round her proportion of hits was lying at 100 percent!

According to her statement she could feel it. A further test subject achieved even at the back of the room with a pendulum the correct answer. I myself was surprised by this and I already have repeated this experiment several times with different success. It without doubt depends on the sensitiveness of the test subjects. Every person after all reacts to other signals.

What however has astonished all participants and can't be emphasized enough at all, is the circumstance that it in this case concerns a receiver and not a transmitter!



Measurement record

System resonance: f = 6,7 MHz, Sinus.

distance transmitter-receiver: approx. 2 m

transmitter coil with HF-braid identical to receiver coil: 38 Windings wound spirally and 33 Windings wound cylindrically.

Load for receiver: metal layer resistor (100 Ohm)

Gauge: Quad 200 MHz Oscilloscope: LeCroy 9304C

Current sample: LeCroy AP015 (DC-50MHz)

Differential sample: LeCroy AP032 (Attenuation Rate: 1/20)

Top: transmitter power consumption with receiver turned on (at 100 Ω-load): 233 mW

Middle: transmitter idle power: (without receiver) 223 mW

Bottom: receiver power output: 49,1 mW

Fig. 19.11 A: Measurement record for scalar wave transmission line

19.11 Wrestling for measuring technical insight in the Transfer centre

In the central question who should be believed more, the famous experimental physicist Nikola Tesla or his critics, my experiments with the Tesla coil were the visible proof that we have to take Tesla's statements seriously. Now not only at myself, but also at the students of the polytechnic and the colleagues of my Transfer centre a true Tesla euphoria broke out.
In every free minute the patents and original writings were studied, which I had myself send from the Tesla Society in Colorado Springs in the USA. In particular my trainees and diplomands developed a incredible ambition in making a historical Tesla concept work. They built a whole series of various high-tension generators. In the laboratory one could hear crashing and there was a smell of ozone.

22.1.1998 at a presentation of the works for a degree the candidate looked after by me very proudly held a fluorescent lamp in his hand, which in the field of his self-built high-tension generator glowed even without any wire connected, entirely according to the great mode (fig. 17.10). At all efforts we however laboratory technical weren't able to reach tension voltages of above 511 000 Volt. But at this tension voltage the actual Tesla effects actually start!

Perhaps it was tough luck, but possibly also a chance that we in the laboratories, which I had at my disposal, were forced to work with lower tension voltages and that meant that we gradually had to beak away from the Tesla designs.
Moreover we hadn't at our disposal the precisely controllable spark gaps, which Tesla had developed and used. If one wants to obtain an if possible high tension voltage change (du/dt) for an interaction with neutrinos, then according to today's technology considerably more favourable concepts are offered, for instance with hard switching Power-MOS-Transistors. 50 Kilovolt per microsecond were to meet.
Therefore we changed the technology and worked from now on with fast semiconductor switches. From the laboratory radio now only a hissing and crashing came out of the loudspeaker, if our experiments were running.

At 12.10.1999 we for the first time succeeded to build up a transmission line for Tesla radiation. Doing so the transmitter and receiver were situated in different rooms of my transfer centre. The transmitter coil was operated in self-resonance and fed only from a small function generator with 10 Volt. But if the diplomand held a fluorescent lamp near the spherical electrode, then it started to glow!
Following I observed at the oscillograph the signal of the receiver coil, which as well was operated in resonance. If the diplomand switched off the transmitter, also no receiver singnal was present anymore. But if it concerned radio waves according to Hertz or Tesla radiation, with that still wasn't answered.
Therefore I prompted still another experiment. This time the colleagues observed at the transmitter the signal at the function generator, while I undamped and again clamped the receiver. The shouting with joy from the adjoining room indicated that it had been observed, how the receiver reacted upon the transmitter and both are in resonance with each other. Such an effect characteristic for scalar waves, is a radio technical impossibility! In the case of radio with Hertzian waves an effect back from the receiver on the transmitter is unthinkable by principle.

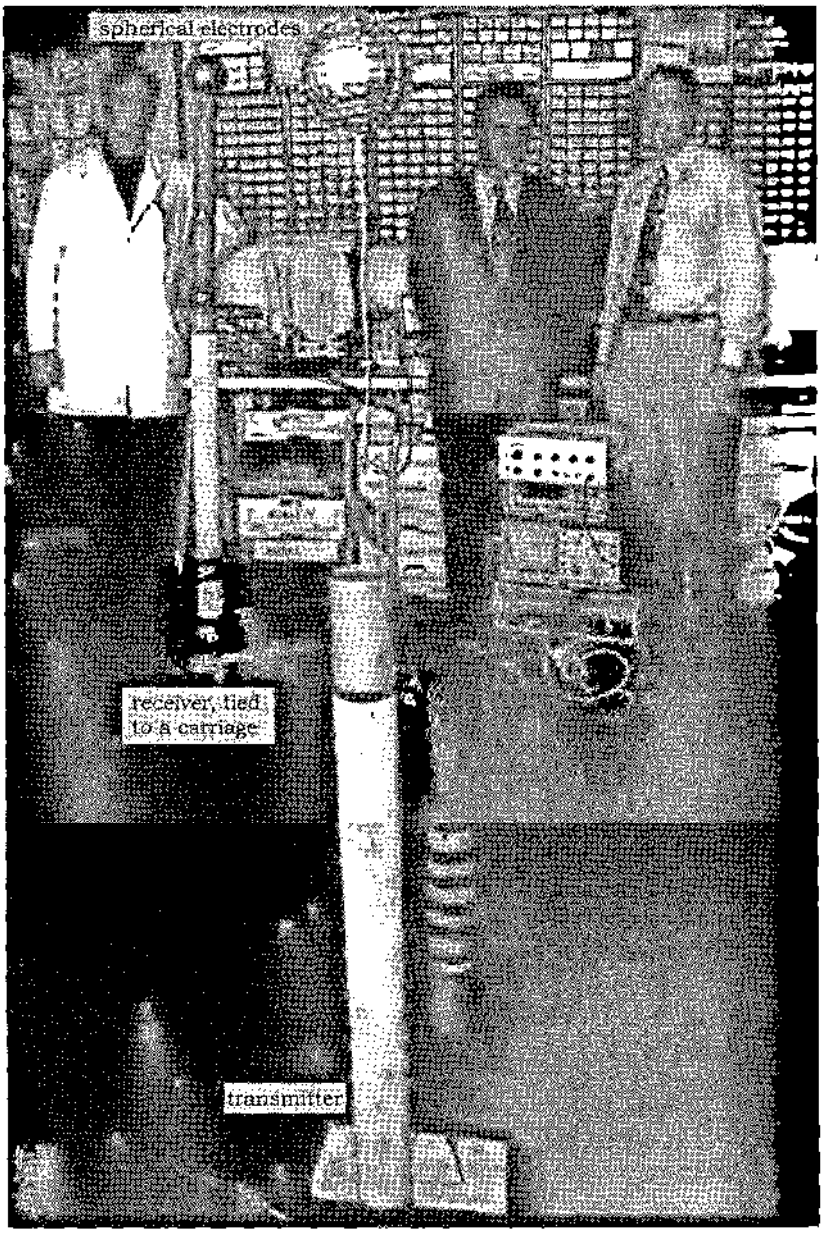


Fig. 19.11 B: Scalar wave transmission line according to Tesla
f.l.tr.: M.Andresen (diplomand), author (TZ-head), Dipl.Ing.M.Rehm (project leader)

In the next step we let glow the famous little lamp on the side of the receiver. As a consumer served a small light-emitting diode, of which the light intensity remained unchanged in the case of resonance. To prove this, we placed the receiver on a carriage and rolled the corridor in the TZ up and down with it. If the receiver was only slightly out of tune, then from the then arising fluctuation the standing wave nature could be observed perfectly.

With the setup it can be demonstrated well, how the law of the square of the distance, of the decrease of the field strength with the square of the distance, known from radio technology hasn't got validity anymore for scalar waves. Very clear also was the energy transmission of scalar waves out of a closed Faraday cage.
In the end we have determined the degree of effectiveness of the scalar wave transmission line. An output power of 49 mW resulted from the measurements of the current and tension voltage for a loading of the receiver with a 100 Ohm resistance. Simultaneously the power taken up by the transmitter amounted to 233 mW. If we however subtract the idle power consumed by the transmitter from this, and that was determined to be 223 mW for switched off receiver, then actually only 10 mW are available for the wireless energy transmission. The degree of effectiveness according to that would be 490%!
If we here really have obtained an over-unity of 4.9 then the receiver must have collected along free space energy, or did some parts evade our power measurement? The sceptics I recommend an own rebuild, since alone the proof of the scalar wave properties inevitably has to lead to every Maxwell burdened HF technician breaking with the old belief.

19.12 Neutrinolysis, the alternative splitting of water

Free after the plans of Stan Meyer we filled diverse containers with water and let it "crash". If then bubbles raised and it got exciting, we changed the frequency and exactly paid attention to the effect remaining the same or if it increased as well with increasing frequency, thus if we only watched a classical electrolysis, or already the wanted "neutrinolyse", as we were accustomed to term the splitting of water in its parts under the influence of neutrinos in the laboratory. Typical for that is a bubbling and "cooking" of the actually cold water produced by the rising gas bubbles (fig. 19.12).

We also have reversed the principle. Doing so we have switched the container as neutrino receiver and measured the forming charge carriers. The passive system proved to be really moody. On the one hand tension voltages of several hundred millivolts at a load resistance of 10 megaohm can be realized, on the other hand the charged gas particles and the as secondary reaction in the water set free ions continually change the electric conductivity, so that the cause to be measured, the neutrino radiation, hardly can be reproduced on the displayed result. The water hence has to be changed more often and also the developers found themselves between jubilation and disillusionment subject to continually changing feelings.

<i>: A. und I. Schneider: Neutrino-Power - Energie aus dem Kosmos, Bericht zu Vortrag und Demonstration des Autors am 25.11.99 in Villingen, NET-Journal 12/99, S. 4-6; Interview mit Prof. Dr.-Ing. Konstantin Meyl: Durchbruch in der Freien-Energie-Forschung, NET-Journal 12/99, S. 7-9

Fig. 19.12: Experimental constructions for the „neutrinolyse".

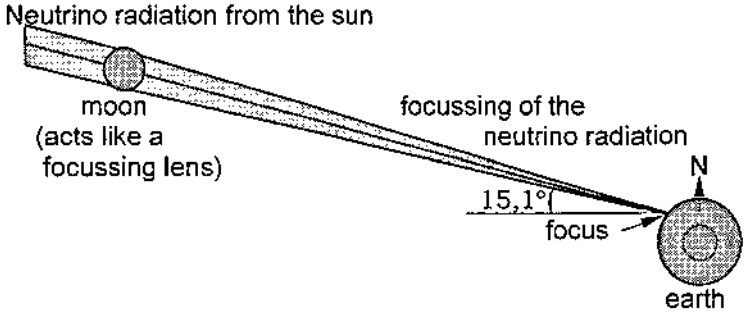


Fig. 20.1: Course of the neutrino radiation focussed by the moon
on the occasion of the eclipse of the sun at the 11th August 1999.<i>

concerning the calculation of the position of the sun at 11.8.99:

at 21.6. after 0 days is	$23.4° \cdot \cos 0° = 23.4°$	northern latitude
at 21.9. after 92 days is	$23.4° \cdot \cos 90° = 0°$	= equator
at 11.8. after 51 days is	$23.4° \cdot \cos \frac{51 \text{ days}}{92 \text{ days}} 90°$	$= 23.4° \cdot 0.644$ = 15.1° n. lat.

<i>: Konstantin Meyl: Zur Brennglaswirkung des Mondes bei einer Sonnen-

20. Cosmic experiments

As long as no usable technical gauges are available, we should observe and study nature and all celestial phenomena. Here the scalar waves with all their properties are presented to us. That is valid in particular for the case that the cosmos makes an experiment with us and with the entire earth. Such a situation offered the eclipse of the sun of August 11 1999 as an unique "bulk experiment" to which travelled millions of spectators, to participate in the cosmic experiment as voluntary test subjects.
My warning for possible influences proved to be absolutely justified afterwards, even if only comparatively few took note<i>. In view of strong changes in the EEG of individual test subjects and a proven temporary acceleration of the rotation of the earth science once more stands before insoluble problems.
To answer the open questions I want to start with my indications, which 1 have published in anticipation of the cosmic event of August 11<i>. Afterwards a revision and the attempt of an interpretation from the scalar wave view follows. Perhaps this way leads to a reliable prediction of of earthquakes and other cosmic events. After that we perhaps know more about origin, availability and further important parameters of the sought-for space energy.

20.1 Millions of voluntary test subjects at 11 August 1999

Astronomically seen, it concerns a harmless natural spectacle as it already was observed more often, if the moon glides between sun and earth and its shadow in broad daylight immerses parts of the earth in a dark night. The special thing about the eclipse of the sun of August 11 1999 however was, that the sun activity just strived for its maximum value in its eleven year cycle, and the orbital distance to the moon simultaneously reached a minimum value. In addition we must pay attention to the special situation of the angles (fig. 20.1). Due to the extremely rare constellation the area of complete shadow at first was larger and darker than normal. On August 11 it had a width of 110 kilometres.

The sun besides the light also sends us solar neutrinos and for those the moon is transparent. It with regard to them acts like a glass ball, which lets the light it is true pass through, but in doing so refracts it. The glass ball acts like a convex focussing lens, which focuses the arriving rays behind the ball in a focus.
To slow down and collect neutrinos the moon it is true is too small, but it will be able to influence the flying direction. Very fast neutrinos, which run through the moon, hardly will be diverted. The slow and biologically active ones however will be bent stronger.

At this point it would be of utmost importance to know, in which distance from the moon the rays run together and combine into a focus.

<i>: Konstantin Meyl: Zur Brennglaswirkung des Mondes bei einer Sonnenfinsternis, NET-Journal, Jg. 4, Heft Juli/August 1999, Seite 13-17

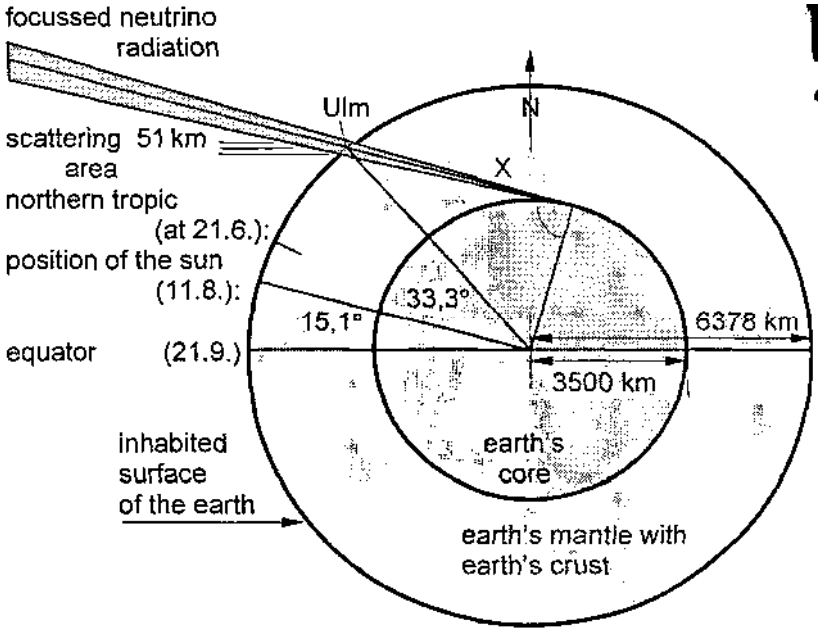


Fig. 20.2: The course of the focussed neutrino radiation at 11.08.1999 for 48.4° northern latitude. (this corresponds to the line Ulm-Augsburg-Freising)

calculation of the critical latitude:

$$\sin \alpha = \frac{3500 \text{ km}}{6378 \text{ km}} = 0.5488 \quad \text{resulting in the angle} \quad \alpha = 33.3°$$

$$+ 15.1°$$

The neutrino rays touch the earth's core at: 48.4° n.lat.

minimum distance to the moon: $r_m^* = 358000$ km
radius of the moon: $R_m = 1738$ km
radius of the earth: $R = 6378$ km (at the equator)
length of the Tangente: $X = 3500 \text{ km}/\tan 33° = 5332$ km

scattering radius: $r_x = X \cdot \frac{R_m}{r_m^* + X} = 25.5$ km around the centre line

Focussing without scattering on earth's surface increase to
$R_m / r_x = 68$ times , resp. with scattering to
$68 * 0.5 * 0.8 = 27$ times the natural neutrino radiation!

For that we again bear in mind that neutrinos as particle radiation propagate in space in the sense of a plasma wave. Since the oscillation of such a longitudinal wave takes place in the direction of propagation, it neither knows a distinct velocity of propagation nor an upper limit.
The sea of neutrinos in which we swim, is a combination of differently fast particles. The slow ones are bent stronger by the moon, with the property of a convex focussing lens, so that the focus should be looked for near the moon, whereas the fast ones hardly are diverted. Their focus lies further distant from the moon than the earth, up to the extremely fast cosmic neutrinos, which experience almost no diversion, because they, as a result of the Lorentz contraktion, are small enough to tunnel through any kind of matter.
If neutrinos, depending on their velocity of propagation, have their focus partly before and partly behind the earth at an eclipse of the sun, then it comes up to a conclusive logic that there actually exist such, of which the focus lies exactly in the centre of the complete shadow on earth's surface. But thereby the question is asked, which biological effectiveness these neutrinos have or which damage they bring about.

20.2 Model of calculation for the cosmic experiment

More than a year ago the results of an international neutrino experiment have been made public. Thereby for the first time the order of magnitude of the natural radiation density was recorded. after the detector before having been calibrated at an artificial source of neutrinos. As the perhaps most important result at night only half as much solar neutrinos could be detected as during the day with the immense Super-Kamiokande detector in a Japanese mine. With that the here taken interpretation, that earth's core collects neutrinos, meanwhile even is proven experimentally! For that it has to interact with the particles and that means, it has to exert a force of attraction on them. Thus the earth's core during an eclipse of the sun will further amplify the effect of focussing if the konzentrierte neutrino ray is directed on earth's core. This critical point we have to calculate (fig. 20.2).

The proportion of the radii of earth's core (3500 km) and the entire earth (6378 km) results in the sine of the sought-for angle and that amounts to 33.3 degrees northern latitude. At August 11 moreover is added that at noon the sun with regard to the equator is standing at 15.1 degrees. so that a first extreme focussing should be expected, if the centre of the complete shadow intersects latitude 48.4. This would be the case for the latitude of Ulm in direction Augsburg and Freising.
Now we would like to know more about the amplitude of the focussed radiation, about the spatial extension and the period of time. Without concrete data material we have to proceed from several simplifying assumptions. If we therefore assume, 50% of the at earth arriving and biologically relevant neutrino radiation stems from the sun, which in the case of an eclipse of the sun is focussed to 80% and scattered to 20% by the moon. If we further assume the focus just touches earth's core, then between Ulm and Augsburg a sphere of action of 50 km can be expected, within which the neutrino radiation on the average reaches 28 times the value of the natural radiation. The intense irradiation under these assumptions will last one minute.

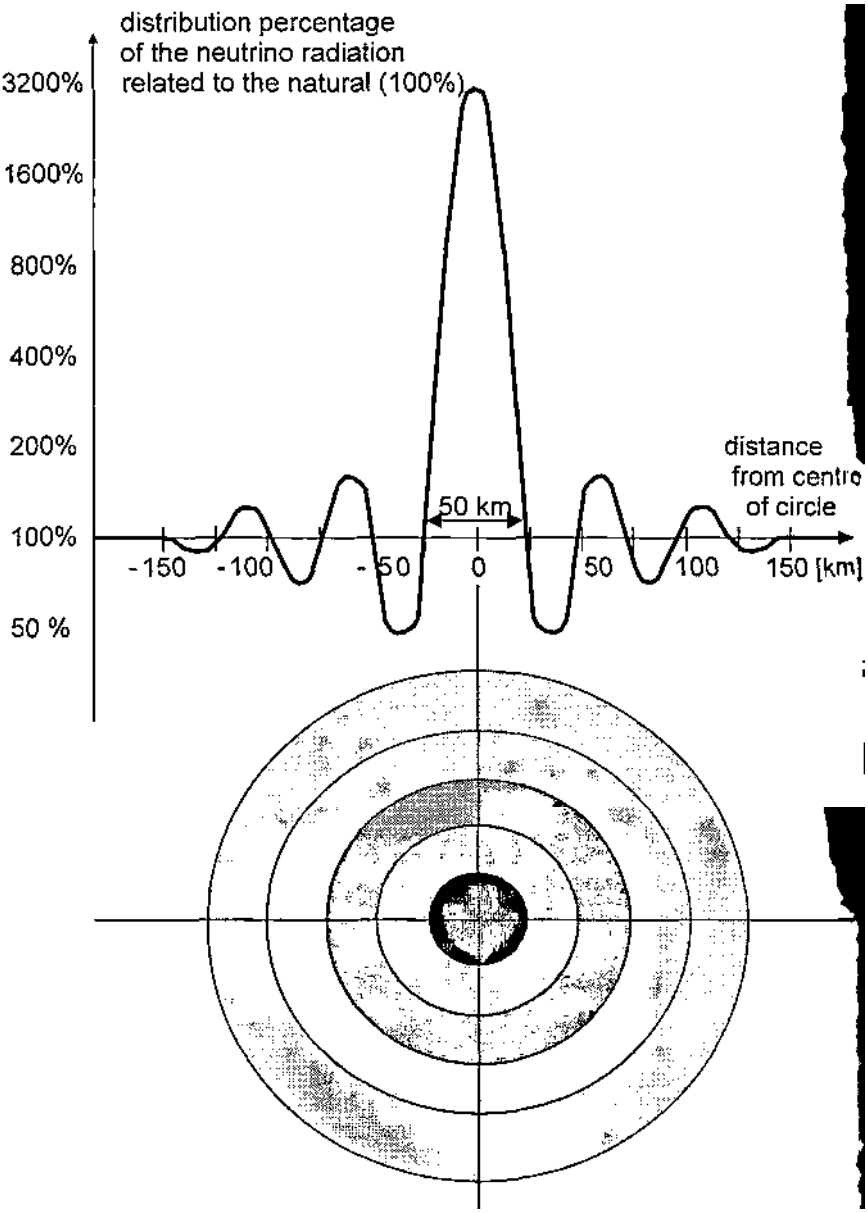


Fig. 20.3: ____ The spatial distribution in the case of focussing of the neutrino radiation by means of the burning glass effect of the moon on earth's surface.

Of course the calculated values only are valid to the extent, as also the assumed boundary values apply. After August 11 we know more about this cosmic experiment, about the spatial distribution and indirectly about the interaction with earth's core, about the physical properties and the biological effectiveness of the at present available neutrino radiation.

20.3 Physical technical consequences

The neutrino radiation is a scalar wave radiation which, as mentioned, can be perceived by sensitive people even without aids. Who hasn't at his disposal this sensitiveness, is recommended a simple setup.
For that one hangs up a fluorescent lamp, connects the one end with a piece of wire, as it were as antenna, and the other end is grounded. For a scalar wave radiation which increases fast, the lamp should start to glow by itself. Under big transmitting installations this method already has been successfully applied by many allotment gardeners thousandfold. I hence recommend all research scientists of eclipses to test themselves the possible field fluctuations in this simple way.

From a technical viewpoint first of all the atomic reactors and their nuclearly contaminated waste will be concerned by a fluctuation of the neutrino radiation. In view of present eclipses of the sun an accident can be expected less, since the neutrino radiation it is true for a short time reaches an extreme maximum, which averaged temporally and spatially over the whole event again is relativized somewhat. The relations shall be clarified with an example (fig. 20.3).
Whoever places himself in the centre line of the complete shadow on August 11, at first will detect a decrease of the neutrino radiation to 50 to 60 percent, then a steep increase to 2800 percent and from the summit again the whole backwards, while standing on the earth he turns by under the moving moon shadow. The ring with half the radiation, which reaches us first, doesn't pose a problem since, as said, we only have half the radiation in every night. Some animals and plants as aresult erroneously will set out for sleep.

The wave distribution one can imagine like that in the case of a pool, in which was thrown a stone. But we still don't know the resonance frequency, for which reason the length of the cycle depicted in fig. 20.3 is chosen arbitrary. The actual deviation from the distribution given by nature is the peak in the focussed ray centre. Living nature must stand large fluctuations of the solar radiation, since every supernova sends us a relatively short batch of fresh neutrinos. Where we have difficulties is the question, how much fluctuation still can be tolerated by mankind.
The question for possible biological consequences is due to be dealt with in view of the announcement of a complete shadow tourism causing concern, as it is awaited for August 11. At the incomplete state of knowledge about the properties of neutrinos, every trip to the complete shadow remains a journey into the unknown.

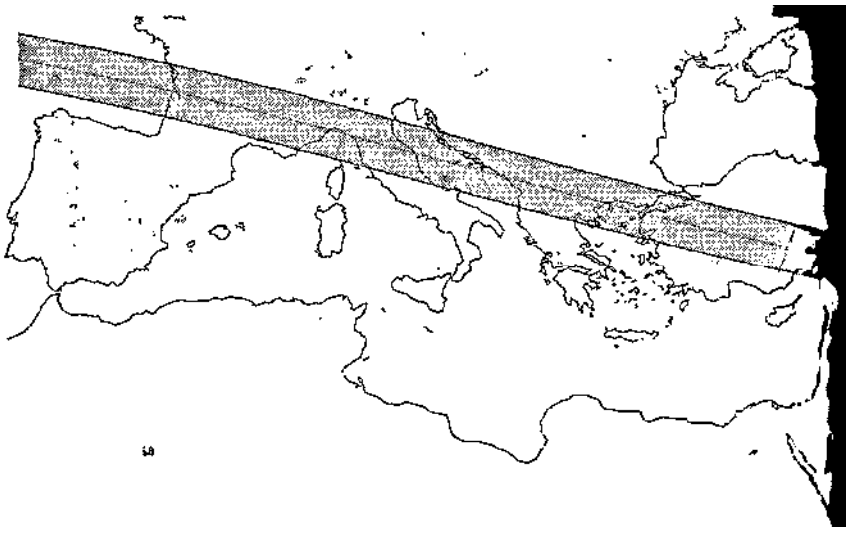


Fig. 20.4 A: The course of the complete shadow for the ancient
eclipse of the sun at 28.5.585 B.C.

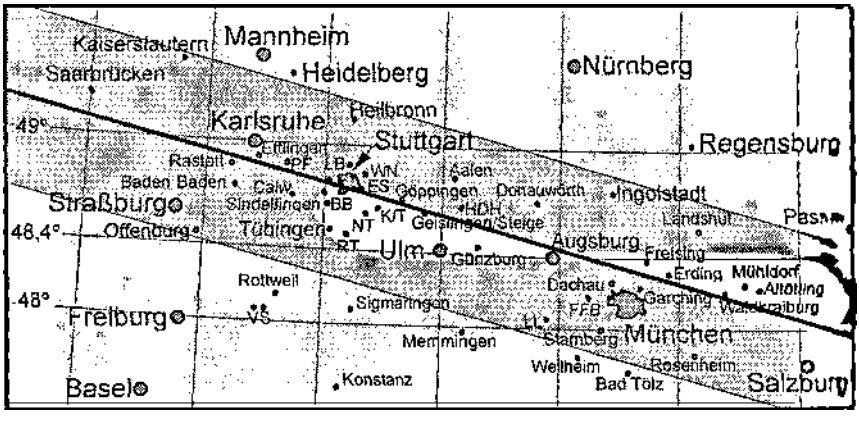


Fig. 20.4 B: The course of the complete shadow over south
Germany at August 11 1999 (grey) and the possible course of the focussed neutrino radiation (white).

20.4 Biological consequences

In the case of an eclipse of the sun effects on the biology, like problems with the heart among affected, at least can't be excluded. If the scalar wave density increases above the density which is normal, then this has a positive effect on the economy of energy, as long as the body is capable to regulate the amount taken up. If the regulatory process however should fail. then the risk of a self-inflammation exists. Also straw bales and other organic and inflammable materials could thus go up in flames.

But before that happens, first the information technical influence of the scalar waves will show. Here we have to expect a psychotronic influencing, which is showing in a limited ability of perception. History teaches us as an example<i> that a by Thales of Milet predicted total eclipse of the sun at 28.5.585 B.C. compulsorily has ended a battle in Asia Minor between the Medes and the Lydians, because the soldiers apparently most literally had gone out of their mind (fig. 20.4 A).

Actually all in connexion with the free energy addressed phenomena are conceivable. from the "neutrinolyse" up to the acceleration of the radioactive decay. It would be understandable, if in a water glass bubbles should rise, even if no carbonic acid is contained in the water at all. After man not having at his disposal a sense organ for his own energy source, the brave in the complete shadow of an eclipse of the sun are recommended smaller technical experiments and observations. The cautious however will avoid the area from the start.

As counter movement to the complete shadow tourists there will also be refugees, who believe in the predictions of Nostradamus, who in his quatrains has predicted a messenger of fright over Europe for 11.8.1999. He mentions Lyon, Ulm and Moskau, which actually lie on one line <ii>.
The line of the complete shadow however will run under another angle from Plymouth in South England over Ulm to Bukarest and further into Turkey. Maybe Nostradamus wasn't a clairvoyant at all, but merely a good calculator, or he knew someone who could calculate excellently, after all he has indicated the time and even Ulm as the centre correctly. Apart from the small angle error, in addition the direction is correct (fig. 20.4 B).

Worth paying attention to also is, that he contrary to his habit here gives a concrete date which astronomically can be calculated unambiguously, that he simply skips the numerous eclipses of the sun of the past and only points to the one of 11.8.1999, which runs crossways through South Germany. Extremely sinister are his forecasts, which mustn't commented on further, since he speaks of "Mort et Tombe", of death and grave<ii>.

<i>: Merodot: Historien, Kroners Taschenausgabe 224, S. 33 (cf. page 586 and the modern misinterpretation note 9 on page 754); further sources: dtv-Atlas zur Weltgeschichte S. 45; resp. Propylaen-Weltgeschichte I, S. 168.

<ii>: Michel de Notredame (1503 bis 1566), Mathematiker, Astrologe, Leibarzt von Konig Karl IX: Centuries (1558) X, Vers 72.

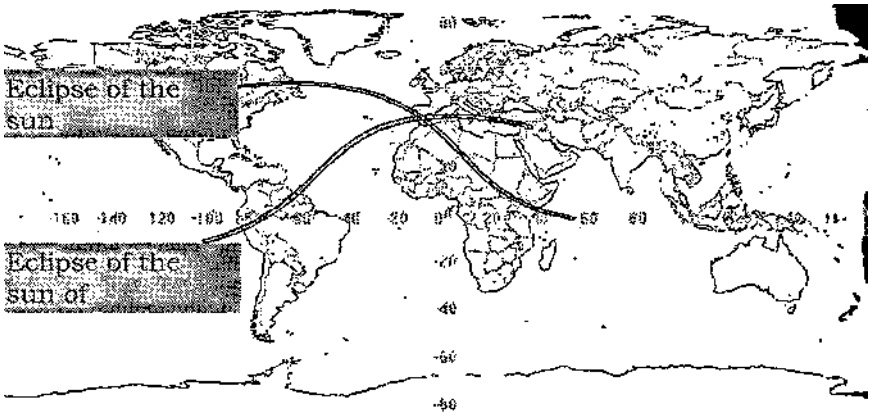


Fig. 20.5 A: The total eclipses of the sun of 18.4.1539 and
21.8.1560

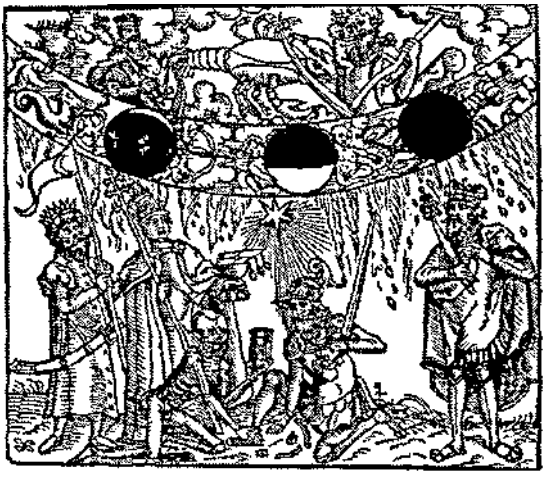


Fig. 20.5 B: Under the impression of the last two eclipses of the
sun over Europe death and war play dice about the fate of mankind during the eclipse of the sun of 1562.<i>

<i>: Werner Raffetseder: Sonnenfinsternis, Hugendubel Verlag, Munchen 1999, ISBN 3-89631-302-9, Seite 156.

20.5 Epilogue to August 11th 1999

My indications have been published two weeks before the cosmic event in the NET-Journal[<i>]. The public interest was immense. Now, after the spectacle is over, it is time for an analysis[<ii>].

Besides numerous very subjective descriptions of eyewitnesses, which scientifically hardly can be analysed, at numerous polytechnics over the world has been observed, how Foucault pendulums suddenly and completely unexpected have deviated from their normal swinging direction. With this device 150 years ago the rotation of the earth had been detected in Paris.
Since according to prevailing textbook opinion an eclipse of the sun is a purely optical phenomenon, the scientists world-wide are having a big problem. Which force here has teared at our earth and caused relative accelerations of the kind that the pendulums could turn out of their usual plane and changed into an elliptic orbit, while the shadow of the moon ran over us? The gravitational force isn't even roughly capable to that. That merely has brought a 50 cm higher flood. The enormous force effect, which even puts the gravitation in the shade, actually only can come from the interaction of the neutrinos.

Different reports are present concerning the influencing of the radioactivity. In the cases, in which measurement samples have been used, almost no change could be observed. This is confirmed by a video tape, which northeast of Munich directly in the centre of the complete shadow documents an experiment, in which during the whole time the radioactivity of 1 kg crude granite is monitored with a professional dosimeter. The background might be that calibrating samples are chosen in principle under the aspect of being influenced the least by outside interference sources. It therefore would have been better, if we instead had put a lettuce as a biological and broadband sample in front of the device. Because there, where one anyway hadn't expected deviations and thus neither were measured calibrating samples nor unfortunately were made recordings, is said to temporarily have occurred a visible increase.
Even in the case that somewhere accidentily should exist recordings, the increase is too small, to help explain traditions from the Middle Ages, according to which is talked about "stinking log" and about "aggressive damps, which fall from the sky". Other sources speak of harmful radiations, which one regarded as the trigger of plagues.
It is said: "They poison the drinking water and the crops and make people sick"[<iii>]. Crops after an eclipse of the sun either should not be harvested at all or only after a violent shower. The warnings for a poisoning "without adding poison", which reach back into the 19th century, suggest the assumption that it concerns results of a radioactive contamination.

<i>: Konstantin Meyl: Zur Brennglaswirkung des Mondes bei einer Sonnenfinsternis, NET-Journal, Jg.4, Heft Juli/August 1999, Seite 13-17

<ii>: From the third and extended edition of this second part concerning Electromagnetic Environmental Compatibility the following chapters are completed.

<iii>: Mark Littmann/Ken Willcox: Totality - Eclipses of the Sun, Honolulu 1991, Kapitel 4: Eclipses in Mythology; nachzulesen bei Werner Raffetseder: Sonnenfinsternis, Hugendubel Verlag, Munchen 1999, Seite 130/131.

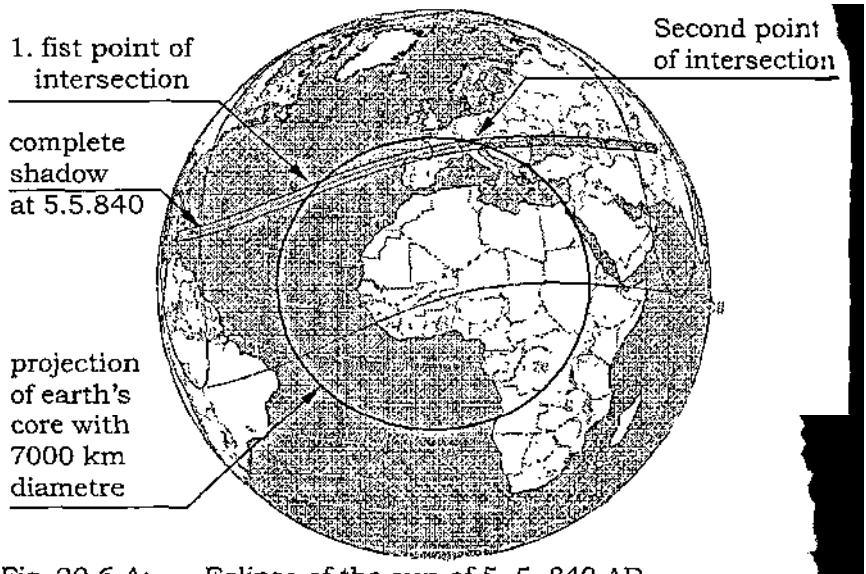

1. fist point of intersection
Second point of intersection
complete shadow at 5.5.840
projection of earth's core with 7000 km diametre

Fig. 20.6 A: Eclipse of the sun of 5. 5. 840 AD.

Fig. 20.6 B: Nostradamus announces catastrophes for 1999 in the Centuries of 1558.<i>

<i>: Bryan Brewer: Eclipse, Chapter 1: Eclipses Throughout the Ages, Seattle WA 1991, S. 20, cited in Werner Raffetseder: Sonnenfinsternis, Hugendubel Verlag, Munchen 1999, ISBN 3-89631-302-9, Seite 130, Bild Seite 159.

20.6 Dropping of the neutrino radiation

Plagues of that kind, which in the Middle Ages have claimed lives as a result of an eclipse of the sun, hardly are verifiable, unless a prominent victim was among them, like e.g. the son and successor of Charlemagne, emperor Ludwig I. He 5.5.840 witnessed an eclipse of the sun with a totality of five minutes. Further it is said: „The fright which this experience gave him, little later shall have torn him to death"<i>.

According to that there must have existed times, in which the radioactivity present in the countryside and stored in the body of a person during an eclipse of the sun could be set free and be the undoing of the affected. At the same time such a decontamination of radiation acts cleaning for nature.

In this case only the interpretation of Nikola Tesla provides us an explanation, which states that the neutrino radiation causes the radioactivity<ii>. Textbook physics however doesn't know this causality. For that the primeval fears of humanity are pure superstition. The prophesies of Nostradamus even are referred to as counter evidence.

But the question remains open, why his predictions concerning August 11 didn't happen, Obviously, so has shown us the cosmic experiment, the neutrino radiation relevant for the setting free of radioactive radiation drastically has decreased since the Middle Ages.

Nostradamus personally has occupied himself with the translation and interpretation of hieroglyphs and has written down his insights - surely out of fear of the inquisition - in the form of encoded quatrains. According to that he has based his considerations on considerably older sources, which presumably stemmed from a time, in which a considerably higher radiation prevailed.

We have to proceed from the assumption that the scientists of the Semitic- Aramean people of the Chaldeans, which ruled Babylon from 626 B.C., were just as capable as astronomers of today, to exactly calculate an eclipse of the sun even centuries and millenia in advance.

After all the Saros-cycle to determine eclipses of the sun is a discovery of the Chaldeans. What they however couldn't know and we ourselves still can't indicate today, is the prevailing density of the cosmic radiation at a future time. But that obviously has changed considerably.

The natural magnetic field strength for instance is recorded at the baking of earthenware jugs and vases, by strengthening along the parts containing magnetite. From the measurement of ancient earthenware goods we know that in antiquity a field strength must have prevailed which was 3 to 4 powers of ten higher.

According to the here presented theory the earth owes its magnetism its core and that again draws its energy from the neutrino field. According to that also the neutrino radiation should be subject to the same decrease.

If therefore the Babylonians out of the radiation situation at that time in the interpretation of Nostradamus and other fortune-tellers, who presumably all more or less have written each other off, have predicted a catastrophe for 11.8.99, then this scientifically is just as untenable, as the today widespread hubris, with which the knowledge and the reports of experience from ancient times are dismissed as superstition.

<ii>: cf. chapter 17.2 Nikola Tesla, the discoverer of the neutrino radiation, p. 133

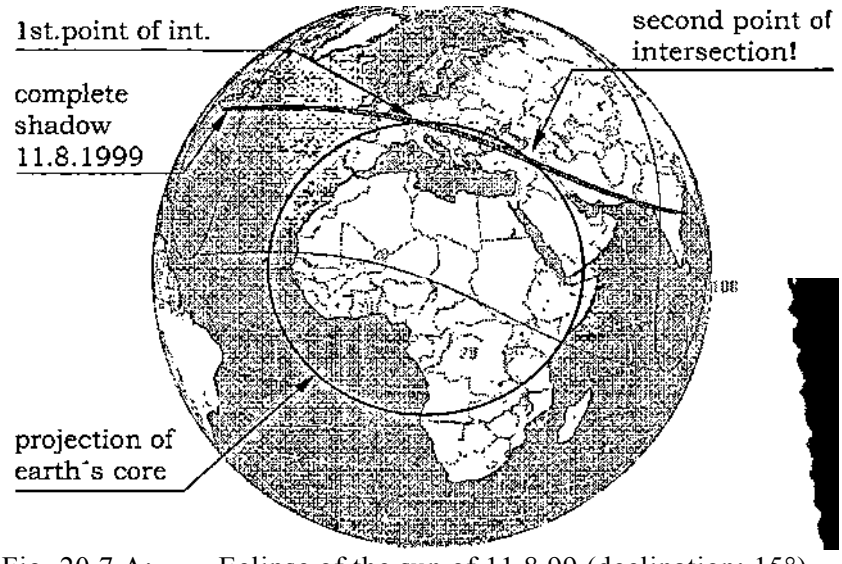


Fig. 20.7 A: Eclipse of the sun of 11.8.99 (declination: 15°)

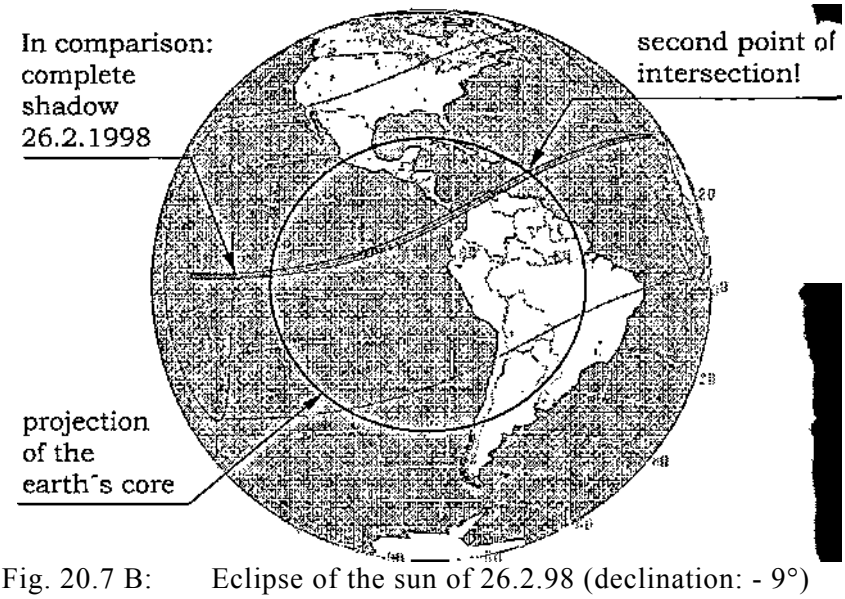


Fig. 20.7 B: Eclipse of the sun of 26.2.98 (declination: - 9°)

<ii>: Particularly violent earthquakes since 11.8.1999 (excerpt): Turkey 17.8. (strength 7.8) till 19.8. (5,0), 31.8. (5.2), Greece 7.9. (5.8). Turkey 13.09. (5.8) and finally Taiwan 20.9.99 (strength 7.6) in a rythm of 6 to 7 days! Complete list in the internet under: http://www-seismo.hannover.bgr.de/ermos_listing.html

This "superstition" mentions tremendous natural disasters like floods like the Flood or destructive earthquakes often as a direct result of an eclipse of the sun, and as the worst consequence the end of the world[i].
Almost all reporters and newsreaders in the evening of August 11 full of irony pointed at the non-occurrence of the end of the world and spread the conviction that according to prevailing physical ideas something like that isn't possible at all. They at that time couldn't know that the anatolic plate, which the complete shadow had crossed, had gotten into motion. The relatively weak earthquakes, which 11.8. shook Cyprus and at the same time Iran, only were spontaneous harbringers.
In the following weeks the staggering core of the earth made us clear that there had been done force to it. Severe earthquakes with thousands of aftershocks followed each other and one message of terror chased the next[ii]. Public authorities however take care not to of decline to make a reference to the eclipse of the sun.

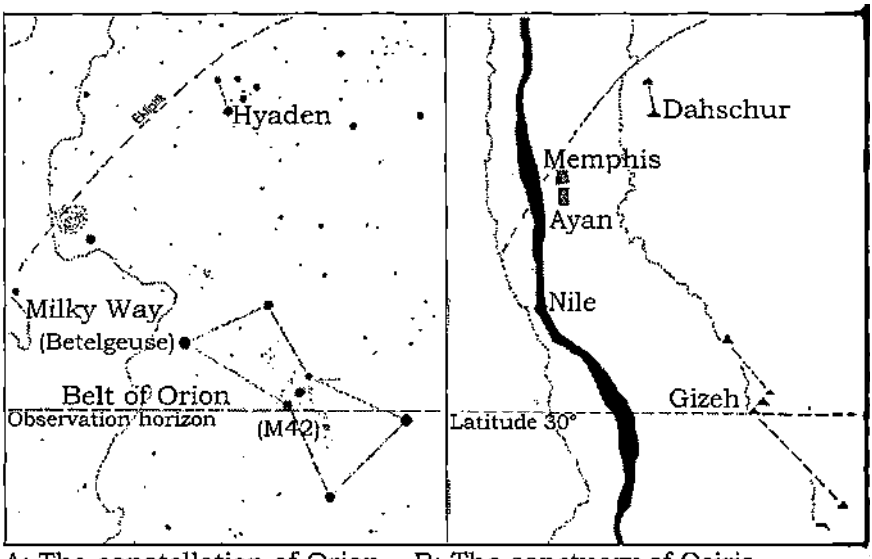
20.7 Analysis and comparison of the occurrences

If we for comparison consult the total eclipse of the sun of 26.2.1998, for which the complete shadow of the moon coming from the Pacific Ocean had run over the Caribbean into the Atlantic Ocean. Exactly the moment it crossed the Caribbean island Montserrat, the volcano Soufriere erupted.
Pure coincidence says science, which hasn't got an explanation model at all for a relation with the supposedly purely optical phenomenon. But this argumentation is relativized, if according to fig. 20.2 the tangential collecting of solar neutrinos by earth's core is considered. This process best can be compared with photon radiation, which is tangentially collected and directed into an orbit by a black hole inside the radius of Schwarzschild.
Since the shadow of the moon always draws a straight line on the earth, two points of intersection are present with the circle of the projection of earth's core on earth's surface, for which the radiation focussed by the moon just touches earth's core and in that way experiences an additional concentration. The first point of intersection at that time was situated in the Pacific Ocean; but the second one was situated exactly at the Caribbean island Montserrat (fig. 20.7 B).

This time, at August 11 1999 the first point of intersection was situated in South Germany, the second in Iran, and again the focussing at the second point of intersection has shown a devastating effect. The entire continental plate has gotten in motion (fig. 20.7 A).

Another strange phenomenon has occurred in the USA at the same time as the eclipse of the sun. A tornado swept with its destructive force right through Salt Lake City. It is remarkable that no meteorologic indications were showing before and hence official observation authorities had no possibility of warning for the tornado. Had here part of the focussed neutrino radiation been redirected at earth's core and given a rotation, to again screw out into the sky on the other side of the earth at Salt Lake City?

<i>: Werner Raffetseder: Sonnenfinsternis, Hugendubel Verlag, Miinchen 1999, ISBN 3-89631-302-9, Seite 120.
<ii>: Collection of particular violent earthquakes since 11.8.1999: see fig. 20.7.



A: The constellation of Orion B: The sanctuary of Osiris

Fig. 20.8 A and B: The ancient Egypt pyramids, a terrestrial model and copy of the starry sky?[i]

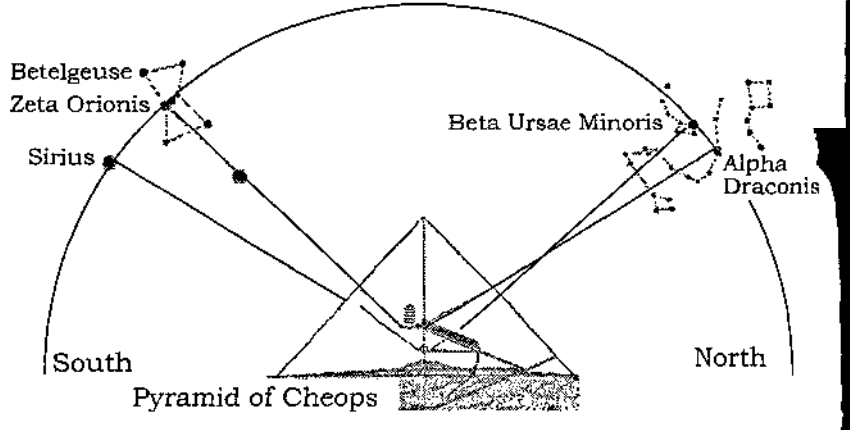


Fig. 20.8 C: The orientation of the four shafts of the Pyramid of Cheops to four different stars around the year 2500 B.C.[ii]

<i>: Robert Bauval, Graham Hancock: Der Schlussel zur Sphinx (Keeper of Genesis), List Verlag Munchen 1996, ISBN 3-471-77188-3, S. 286 und 287.
<ii>: dito page 86.

20.8 Radioactive decontamination with the help of a supernova

A mighty source of neutrinos forms the black hole in the centre of the Milky Way. For us, on an outer spiral arm of the galaxy, the distance to the centre is gigantic as well, so that a relatively equally distributed spectrum of differently fast neutrinos arrives at our world, which represents a kind of basic energy technical supply for the solar system and our world. For the fluctuations between day and night, or the focussing by the moon or other planets the "participants" in the solar system are responsible themselves.

In contrast to that a supernova, the explosion of a star, is a considerably smaller source of neutrinos, which however also is possible less distant to the earth. In addition it is a singular event, in which all neutrinos are set free simultaneously within a fraction of a second. They arrive at us one after another. First the fast and hard radiation reaches us as it were as harbringer. In the course of time the arriving neutrinos then become slower and shower, until they sometime become biologically relevant. If in the end everything is over, we can see the cause, only now the supernova is showing in the telescope.

If we assume such an event takes place, with perceptible might and in a distance of 500 light years. then this neutrino radiation overlaps with the general background radiation and a characteristic over-intensification of neutrinos of a certain velocity of propagation occurs. This problem then occupies us for 500 years, where the respective radiation situation permanently is changing depending on the time after the explosion.

If we in this way of looking dare a judgement of the cosmic events in historical time, so makes believe much the assumption that the radiation in the last hundred years has worn of completely. Edgar Cayce treats in the book "Our Ancestors" different cultural circles from the old Indian up to the Hopi, in which still is talked about an energy technical use of quartzes and other materials<i>.

We indeed can theoretically comprehend that the neutrino radiation can let an oscillating quartz glow, if it is stimulated in its resonance frequency, but technically the technology foday can't be realized anymore. Possibly the chance for technological use only existed for a few years or decades.

Presumably also the pyramids originally have been built as resonators, to slow down fast neutrinos to a technically utilizable speed. But in the course of time the original function was unnecessary and the neutrinos had gotten so slow that in antiquity alternatively an use as electrostatic lightning generator or as Nekropolis took place. Today they only stand in the countryside as unusable monuments of a gone epoch.

Many ancient techniques, to which I will come to speak in the third part, in this way just as unexpected become plausible as the radioactive decontamination described in the Middle Ages.

<i>: Hermann Wild: Technologien von gestern, Chancen fur morgen; Jupiter-Verlag Bern 1996, ISBN 3-906571-13-0, (z.B. S. 77 und 145 bis 163).

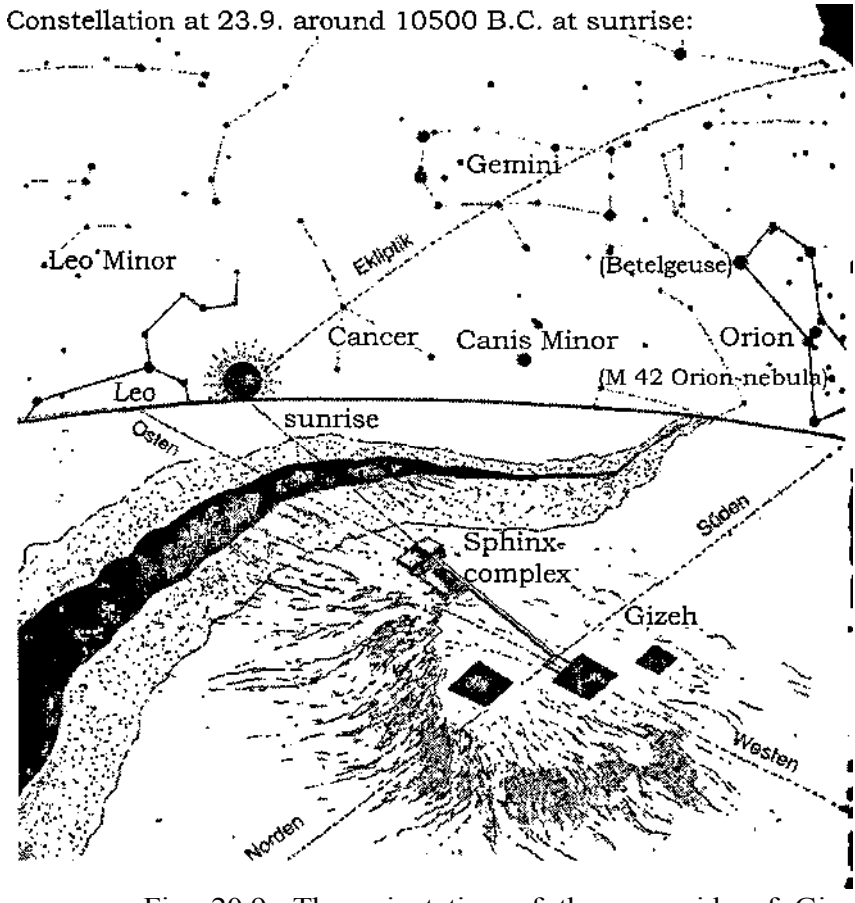


Fig. 20.9: The orientation of the pyramids of Giza makes believe
an operation of the installation around 10500 B.C.<i>

<i>: Robert Bauval, Graham Hancock: Der Schlussel zur Sphinx (Keeper of Genesis), List Verlag Munchen 1996, ISBN 3-471-77188-3, S. 324.

The two research scientists take the hypothesis of an orientation of the ancient Egypt pyramids after the starry sky around 10500 B.C. This however is not compatible with their thesis of the aligning of the shafts to individual stars around 2500 B.C. (fig. 20.8 C). How should the precise worked shafts later have been integrated? It would correspond a certain logic, if an orientation of the buildings to the energy source at that time would have taken place; but doing so it should be taken into consideration that the stars are exploded as supernovae and today hardly might be observable.

Despite several good ideas more questions are raised by the book, than are answered. Have the technicians 2500 B.C., after making restorations, experimented with the buildings and sought-for alternatives of use?

20.9 Fre energy from the Orion constellation

After all hundred years ago still the last unreliable rests of the wearing off neutrino radiation were available to Tesla, Moray, Keely and other inventors for the experimental proof of free energy, of which we today aren't able to rebuild and show in function one single model. And that, although the technical aids have gotten better for many times. But for the free energy inventors that isn't a reason, to immediately stop their efforts, because the next supernova already is announced by the actual swings of the Foucault pendulum. It could concern the explosion of the giant red star Betelgeuse in the constellation of Orion in a distance of 500 light years<i>. It well may be possible that it already shortly has exploded and that it will supply us with fresh and free energy for scarcely the next 500 years and at the same time will give the earth a good shake, thanks to its might and a not too great distance.
The reaction, which happened after August 11, of earth's core, which is the first to interact with the fast particles, should make every astrophysicist clear that here something is coming towards us!
It would be obvious, if the reactions of earth's core still increase. Every year particularly around 21.6., if the sun is standing in the Orion constellation, deviations can be expected. But then the supposed source of neutrinos, Betelgeuse, the sun and the earth don't exactly form a line, because the giant red star lies 7.4° below the ecliptic. Because of that the rays slowed down and focussed by the sun run away over the earth. At the earth then rather would be expected a dropping of the radiation.
If the phase of shakes of the earth sometime should be over, a decontamination due to an increased radioactive decay and various biological effects should be expected. Then, perhaps in 200 years, also many concepts concerning free energy, today still dismissed as hopeless, suddenly will function entirely by themselves.

The relatively free possibility of development of the human mind and the present sciences we possibly owe the special circumstance to be able to live in a time of minimized field strengths. Strong fields however can lead to psychotronic influencing of the consciousness and to an outside determining of mankind. This circumstance seems to have caused Tesla to compare man with a robot, and to call him an independent machine controlled from outside<ii>.

<i>: Freek Reijmerink: Sternenatlas Deutschland, Weltbild Verlag 1990, S.12 (ein sterbender Riese) und Illustrierte Wissenschaft, Nr. 9, 1999, S. 7, Brennen die grossen Sterne in den Sternbildern je aus? Die Entfernungsangaben schwanken zwischen 270 Lichtjahren (Meyers Lexikon), 310 (Sternenatlas), 500 (Ill.Wiss.) und 652 Lichtjahren (Cambridge Enzyklopadie d. Astronomie).

In the observable domain of the starry sky one statistically seen has the chance, to experience every second a supernova.

<ii>: Nikola Tesla: How cosmic forces shape our destinies, New York American, 7.2.1917, and Edition Tesla (1997), Bd. 6, ISBN 3-89539-245-6 der Mensch als machine, S. 65.

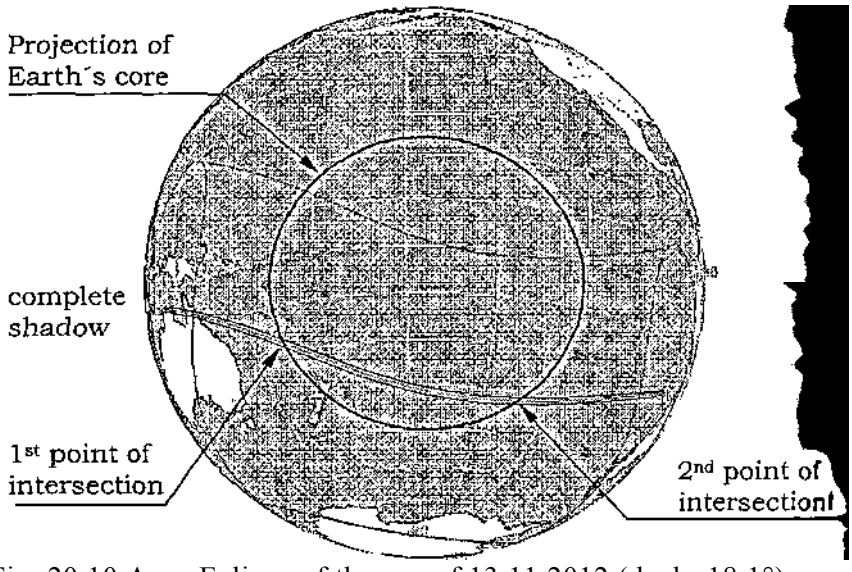


Fig. 20.10 A: Eclipse of the sun of 13.11.2012 (decl.: 18.1°)

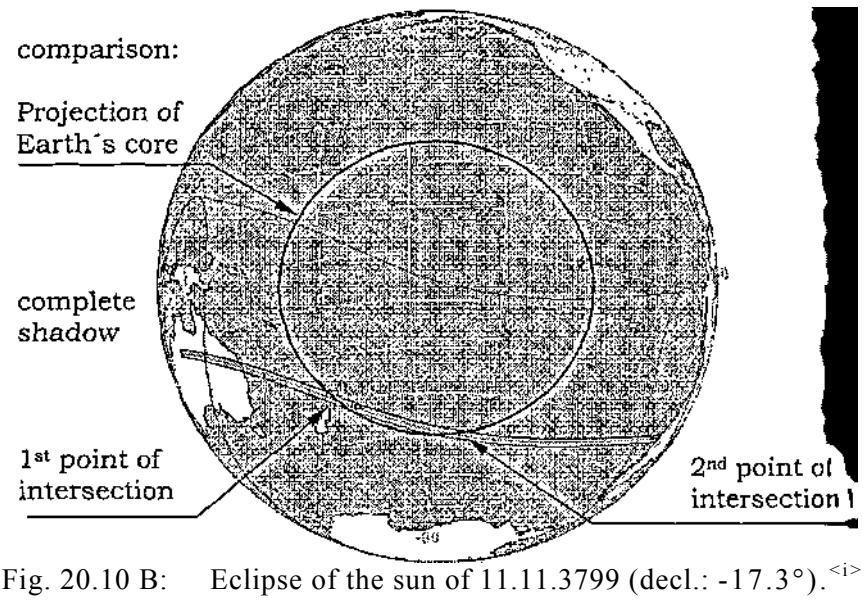


Fig. 20.10 B: Eclipse of the sun of 11.11.3799 (decl.: -17.3°).<i>

<i>: The eclipse of the sun of 7.7.3797 is harmless compared to that of 11.11.3799. Have they been mixed up or is a calculation error present?

20.10 Interaction of the neutrinos with earth's core

A strong neutrino field still doesn't make a catastrophe. Only in connection with one of the regularly happening eclipses of the sun should one be expected under certain circumstances. Only, which eclipses of the sun can get dangerous, we have to ask us, and why warns e.g. Nostradamus only for very particular dates?
The check of the respective eclipses of the sun results in a critical constellation every time for the cases, where the line of the complete shadow and the circle of the projection of earth's core intersect under a very flat angle and both points of intersection lie very close together. In the extreme case finally the lines only are touching and the points of intersection fuse to a line of intersection.
A corresponding constellation the next time is expected at 13.11.2012. For 7.7.3797, at similar conditions Nostradamus foretells the end of the world; but why?

From the interaction of the neutrinos arises as from every other interaction a force effect. If the points of intersection lie far apart, then earth's core is pulled once to the East and a short time later again to the West by the focussed neutrino radiation. On the average this will hardly influence earth's mantle and earth's crust because of the immense moment of interia. The possible earthquakes will remain regionally restricted to the area around the two points of intersection.
But if a line of intersection forms, then no compensation of the force effects takes place anymore, then during the whole time one-sided is pulled at earth's core and that can have fatal results. It is the same as for a spinning top, which is given a blow from the side: it staggers several times, until the gyroscopic forces have stabilized it again.

But if earth's axis staggers, then the sun describes strange orbits in the sky, it goes backwards again, for a longer time doesn't set or it doesn't show for the same period of time for the people living on the other side of the globe.
Such an event already is described in the Bible<i>. For the twenty hours, in which in Europe the sun didn't set for a day, again describe the chroniclers of the inhabitants in the South American Andes, how at their place the sun didn't show for twenty hours<ii>.

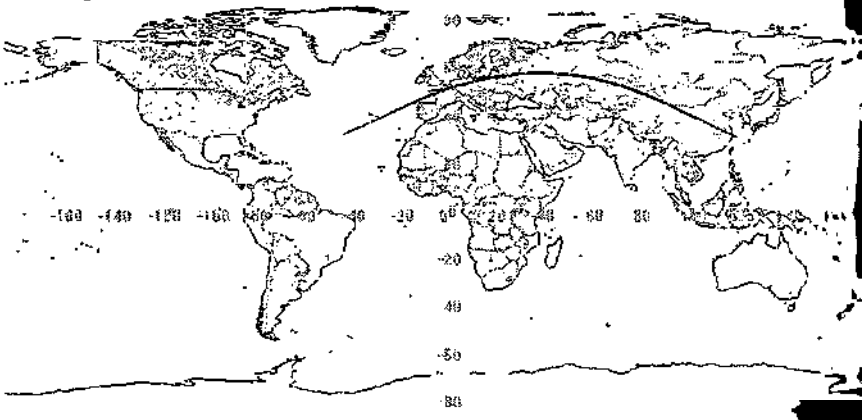
As a further example from the Greek mythology is mentioned the description of the poet Apollodoros. according to whom Hercules for the solution of his 10th task let the chariot of the sun bring to a standstill. "He turned his vehicle round and raced the way back, dragging along the Pleiaden and all stars, so that the sun set in the East"<iii>. But if all stars take part in the same backwards motion, then this example proves the assumption of the staggering earth's axis.

<i>: Josua 10.13-14 and the in chapter 11.8 cited passages.

<ii>: nach Montesinos, zitiert in Zecharia Sitchin: The Lost Realms (Versunkene Reiche), Knaur Verlag Miinchen 1992, ISBN 3-426-04827-2, S. 203

<iii>: Werner Raffetseder: Sonnenfinsternis, Hugendubel Verlag, Milnchen 1999, ISBN 3-89631-302-9, Seite 18.

A: Map of the world



B: Globus

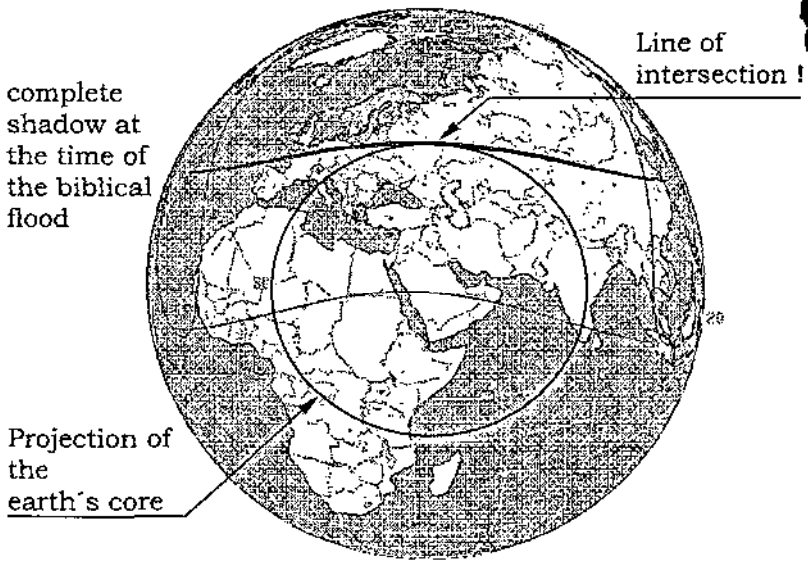


Fig. 20.11: Eclipse of the sun of 27.07.2281 B.C.
(angle of the sun = declination: 19.3°)
The trigger of the biblical Flood?

20.11 Changing of polarity and apocalypse

The pulling at earth's core, which shows as a wobbling of the magnetic axis and in damped form can lead to a tilting of the axis of rotation of the earth, still doesn't make an apocalypse, no end of the world. This only can be expected, if after a tilting of the axis of rotation of earth's core a change of polarity on the surface of the earth occurs. Doing so the new magnetic poles, like a compass needle in the field of the solar wind, again align in such a that the North Pole will be lying "up" in the ecliptic. Because earth's surface will keep it direction of rotation, the sun will, after the process having stabilized, as usual again rise in the East and set in the West. But the inhabitants of the earth, which before still were having midsummer, find themselves again in the midst of midwinter and vice versa.
Truly apocalyptic processes can be expected during the phase of a change of polarity of the earth. Thereby occur unusual relative accelerations and violent earthquakes. The largest destructive potential however is present in the waters of the oceans, which are set in motion.

As is well-known the earth at the equator is measuring a radius which is 21 kilometres larger than at its poles. If only a part of the waters temporarily flows in the direction of the poles of the earth, then the biggest part of the habitable land in Middle and North Europe sinks in the floods; then indeed also the statement of Noah makes sense, who as the first thing saw the mountain of Ararat rise from the floods, after the water again flowed back into its usual ocean basins. The mountain of Ararat after all measures a height of 5137 meters above sealevel!

At comparing historical events with details from the Bible the Flood should have taken place in the year 2245 B.C.<i>. According to the description of the position of the stars Dr. Wild calculates July 2281 B.C. as time for the Flood. The Arabic historical writer al-Makrizi again shifts the event into the year 3094 B.C.<i>. Who is right? We must verify the eclipses of the sun in this time and determine the position of the points of intersection, then we perhaps find the correct answer. Possibly earth's axis has wobbled more than once, have occurred several catastrophes in different regions. At 27.7.2281 B.C. in any case there actually has occurred an extremely critical constellation, whereas the other two years are ruled out. Here no total eclipse of the sun took place (fig. 20.11).

According to the calendar of the Ugha Mongulala 6110 years before this Flood a still much more devastating one should have occurred. That therefore would have been 8391 B.C., while Scott-Elliot dates the catastrophe in the year 9564 B.C.<ii>. According to Plato it would have been about 9500 B.C. For such long periods of time a check however isn't quite easy anymore, because the meantime changes of the earth sum up considerably.

<i>: Wild S. 231, 229 and 225.

<ii>: Wild S, 219, 218 and 210, among others cited from Scott-Elliot: Atlantis und das untergegangene Lemuria, Bauer Verlag Freiburg 1977.

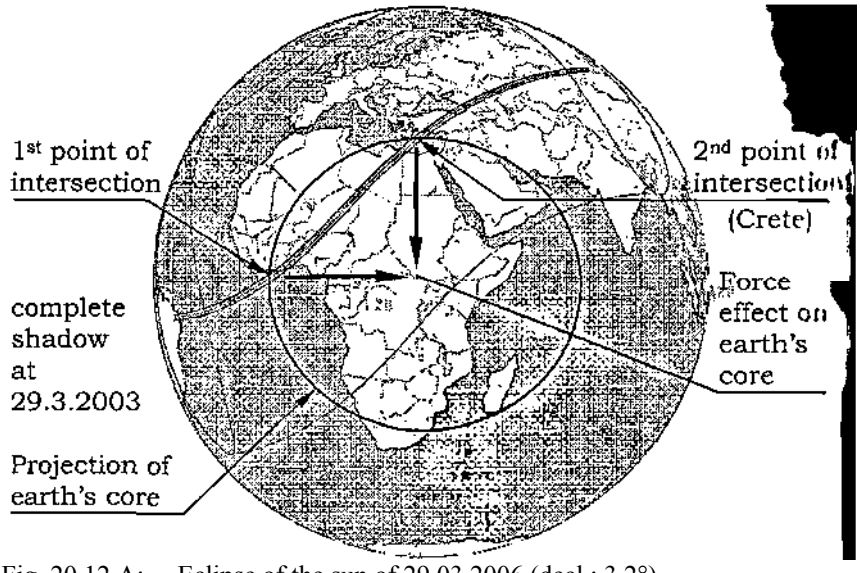

1st point of intersection
2nd point of intersection (Crete)
complete shadow at 29.3.2003
Force effect on earth's core
Projection of earth's core

Fig. 20.12 A: Eclipse of the sun of 29.03.2006 (decl.: 3.2°)

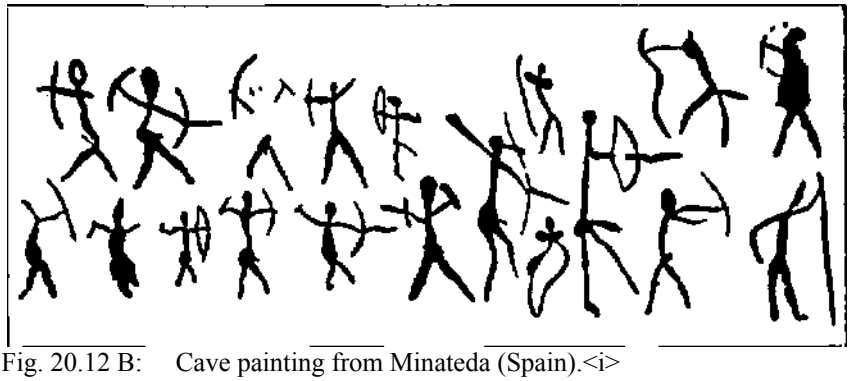


Fig. 20.12 B: Cave painting from Minateda (Spain).<i>

<i>: Laviosa-Zambotti: Origini e Diffusione della Civilta, Marzorati, Milano 1950,

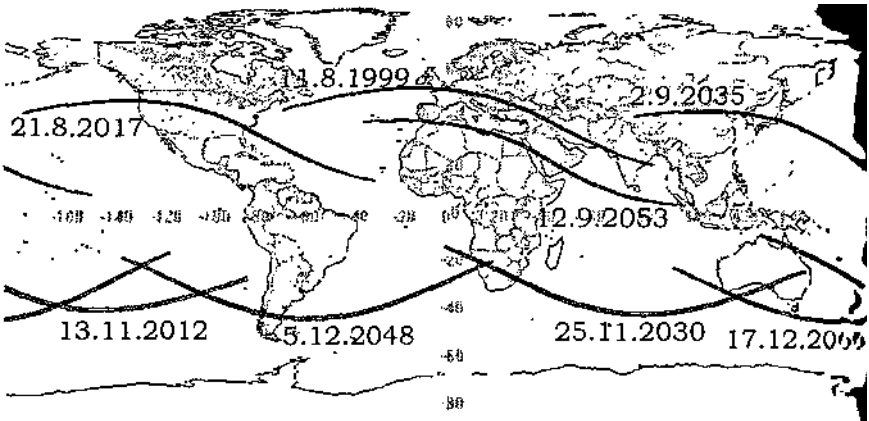
Besides the constellation of sun and moon is crucial the occurring of a relevant neutrino radiation and the question if both is sufficient to tilt the earth and change its polarity. Some experts expect a change of polarity for the time coming, since it takes place with a certain regularity and measured in earth historical periods of time in addition fairly often! This circumstance the earth presumably owes the river valleys cut deep in the countryside and other topographic phenomena. One presumably can only survive such a catastrophe in an ark (Noah), in the air bubbles of large caves (the walls of which painted children and artists out of pure boredom, see fig. 20.12 B) or in the highland, preferably in the area of the equator (Central Africa, highland of Mexico, Andes, Himalaya).

20.12 Scalar wave gauges for the prediction of earthquakes

We urgently need gauges, to be able to judge the neutrino situation. At first we with that pursue the same goal, as with the building of a free energy converter, however with the difference that the converter should maximize the collected amount of energy, whereas the gauge should minimize the taken up energy, to not too much load the source and not to change the local radiation situation.
In addition the neutrino radiation should be registered distinguishable in its velocity of propagation, what means that the building of a gauge will be very much more costly than that of an energy collector. That's why it can be expected that an usable measurement instrument might be available only many years later and we that long only can base on our own power of observation.

We for instance can statistically analyse, how the earth after an eclipse of the sun reacts to the neutrino radiation focussed by the moon. At August 11 the second focal point was situated in the East, and from that an acceleration of the rotation of earth's core can be predicted. Corresponding observations actually have been made on the surface of the earth with the help of the Foucault pendulum.
The relation the next time can be checked at the eclipse of the sun at 29.3.2006. This time the inverse case is present. A first focussing takes place in the West, so that pendelum swings in the reversed direction would be expected, which indicate a slowing down of the rotation (fig. 20.12 A).

But if the rotation of the earth should change, then the balance sheet of angular momentum of moon, earth's mantle and earth's core isn't correct anymore. As a result a force of difference occurs, which lets the spinning top stagger. But if earth's core staggers inside of earth's mantle, then it powerfully stirs the liquid magma, and in this way releases its surplus energy again. As a result earth's mantle is heated up somewhat. We, on our wafer-thin earth's crust, then time delayed feel the effects of the staggering of the core as an earthquake. The period seems to lie at approximately 6.5 days, as far as this can be read from reactions to the last two eclipses of the sun.



Tafel 20.13 A: Eclipses of the sun of 2 Saros cycles.

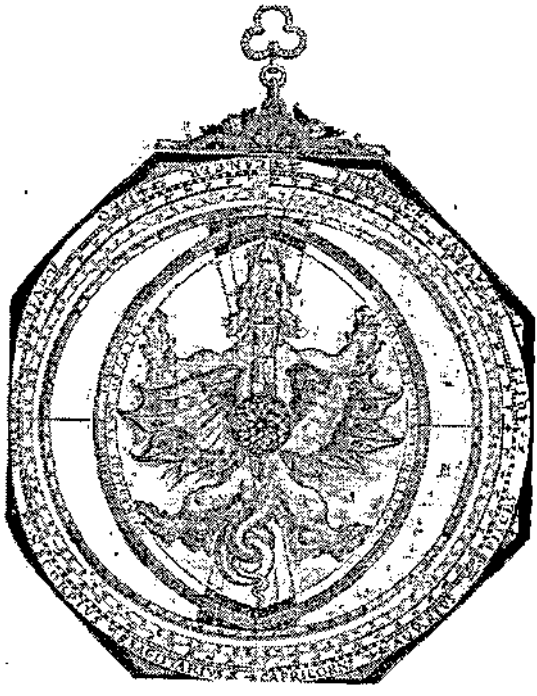


Fig. 20.13 B: The „Astronomicum Caesareum" served around 1540 the determination of the positions of the moon nodes.<i>

<i>: Werner Raffetseder: Sonnenfinsternis, Hugendubel Verlag, Munchen 1999, ISBN 3-89631-302-9, Seite 134.

20.13 Calculation of future occurrences

From the analysis of past and present cosmic events with a strict scientific procedure can be predicted to a certain extent also future events. It thereby by no means concerns prediction, but exclusively the result of an analysis.

After the mentioned eclipse of the sun of 29.03.2006 there once more exists danger of earthquakes (approx. 4.4.2006) for the Island of Crete and Asia Minor. From the eclipse of the sun of 13.11.2012 as well no good can be expected, even if the points of intersection, situated close together, lie far away from populated land in the south-west Pacific basin. The Maya calendar by the way ends to this time. At 21.8.2017, 18 years or a Saros cycle after the eclipse of the sun at 11.8.1999 and correspondingly 120° further to the west, the corresponding complete shadow runs crossways through the USA. The thankless role of Turkey at the second point of intersection this time takes over South Carolina. One only can hope that the houses in Columbia are built more stable than in Izmit.
In fig. 2013 A the two eclipses of the sun of 11.8.1999 and of 13.11.2012 with their respective Saros cycles until 2066 are shown. The as critically to value tendency of the course of the complete shadow is visible, which wants to nestle against the circle of the projection of earth's core to form a line of intersection.

I here break off, since anyone with my indications and an eclipse of the sun-CD can analyse at home all further events personally. I value that if possible many analyses are made and controversially discussed, because possible cosmic catastrophes concern us all somewhat.

What good is the building of gigantic fusion ovens, if the runners by no means have understood the process of the fusion themselves? Why build ring accelerators for billions of dollars, if elementary particles can be calculated at the desk? How is the expenditure for gravitational wave detectors justified, if the actual music plays at entirely other velocities of propagation? Why is half the annual production of the world of Gallium used for an indirect proof of neutrinos, if every self-wound Tesla coil is able to collect more neutrinos?

Our scientists, for whom I as a colleague quite often must be ashamed, have the primary task to draw attention to cosmic and other risks and to calculate them in advance. In any case it is extremely unpardonable to leave this core duty up to some fortune-tellers and self-appointed prophets.
One should more often remind them that the Chinese Kaiser Tschung-Khang let sentence his court astronomers Hi and Ho to death, after the two not having predicted an eclipse of the sun. It thus certainly didn't concern a missed spectacle or a missed tourism business, but presumably the need for safety of the Kaiser and his subordinates, for which the two astrophysicists in ancient China had to take responsibility!

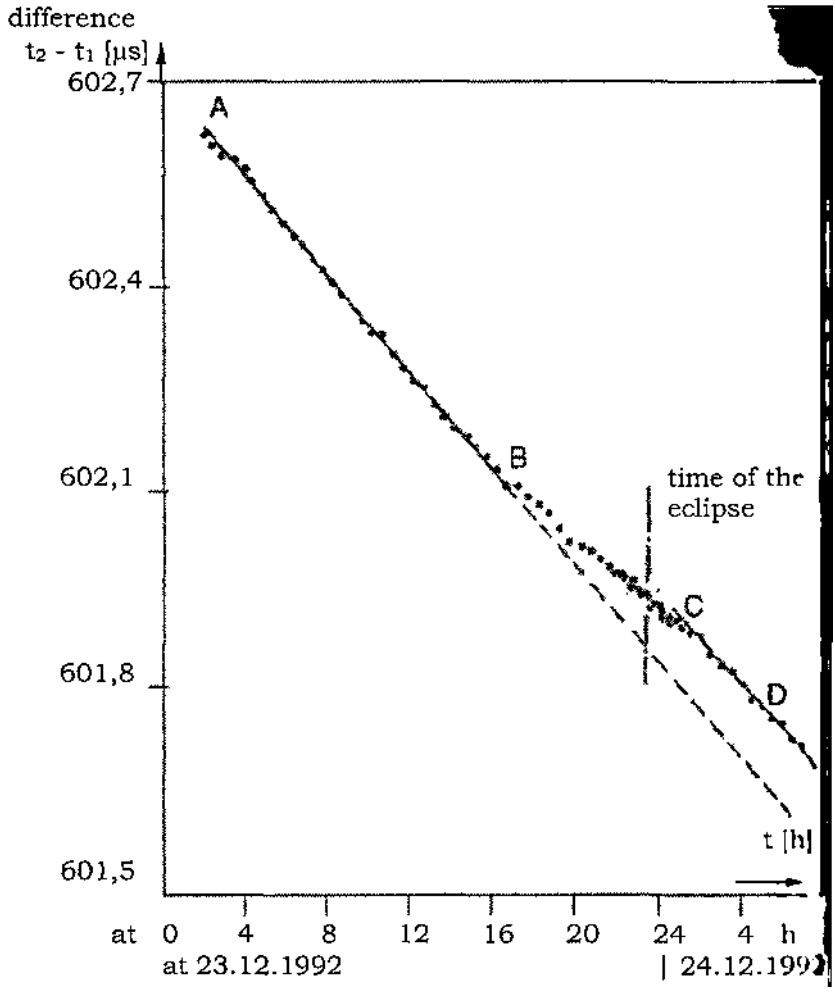


Fig. 20.14: The difference in going of two caesium atomic clocks
positioned in different directions, but in the same laboratory in Harbin, China, during the partial eclipse of the sun of 24.12.1992.<i>

<i>: Shu-wen Zhou: Abnormal Physical Phenomena Observed When the Sun, Moon, and Earth are Aligned, 21st Century Science & Technology, Fall 1999, Vol. 12, No. 3, pp. 54-61. Comments concerning Figure 9: Straight lines AB and CD show that the rate of change of the time difference between the two clocks is constant in non-eclipse periods, but becomes irregular around the time of the eclipse.

20.14 Epilogue to the energy technical seminar

Very slowly the word goes round that the energy source of the future has got a name: "Neutrinopower". Unfortunately fundamental physics, which is financed with public money, still does know almost nothing about the nature of the neutrino radiation. In addition hinder useless model concepts any progress in this direction and so the responsible fundamental research steps on the spot.

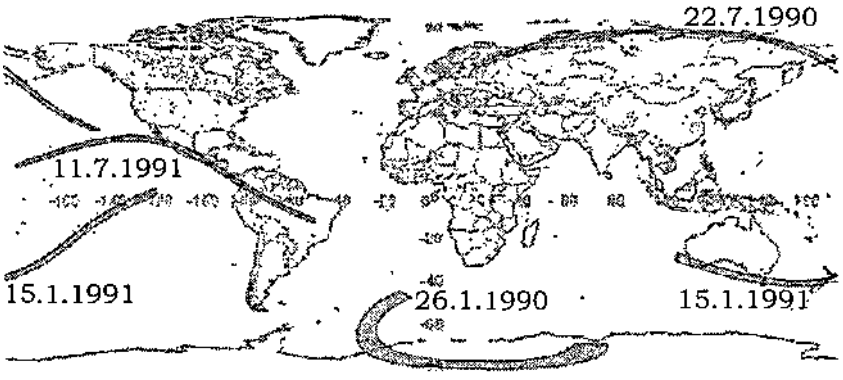
Considerably more extensive were already 100 years ago the insights of the experimental physicist Nikola Tesla, the discoverer of the neutrino radiation and father of the free energy. The space energy however is showing most clearly in nature, which only uses this advantageous form of energy. In particular during eclipses of the sun and other cosmic experiments it openly comes to light and can be detected by us for a short time.

The physicist Prof. Shu-wen Zhou of the University of Huazhong in Wuhan, China, systematically has investigated the effects, if sun, moon and earth are aligned<i>. Doing so he has proven inexplicable physical anomalies in experiments. Stimulated by the discoveries of Maurice Allais with the Foucault pendulum he built an arrangement specially flor proving horizontal forces of acceleration, and actually he with that could measure face effects during the total eclipse of the sun of 24.10.1995. He even speaks of an oscillating force!

Further he could determine changes in the spectral wave length of various elements, which under normal conditions go as constant and even as characteristic for the respective element. The relative change of size of the wave length during the ring-like eclipse of the sun over China of 23.9.1987 resulted in the 100-fold value compared to the difference in the spectrum analysis between surface of the earth and surface of the sun! This comparison reveals an immense discrepancy between theory and practice and puts us for a solid problem.
For that six different models of spectrometers were installed in several laboratories of different polytechnics and a photograph was taken of the emission spectra of H, D, Ca, CN, Ni, Ti, etc. Also other reasons than that of an eclipse of the sun could be excluded unambiguosly. In the results of these, at artificial light carried out conventional measurements, in any case abysses yawn. The from spectrum analyses won "insights" about the composition of strange celestial bodies now for sure can be done away with without knowledge about the respective prevailing neutrino radiation.

Spectacular also is the proof of differences in going of atomic clocks of various constructions. During the partial eclipse of the sun of 24.12.1992 seven caesium clocks in four cities of China and in three planes were used. The analysis of the differences in going resulted in, as is shown exemplary in fig. 20.14, changes of the gradient during the eclipse. The results for the atomic clocks in the planes and for two further time measurements turned out with similar clarity<i>.

<i>: Shou-wen Zhou: Abnormal Physical Phenomena Observed When the Sun, Moon, and Earth are Aligned, 21st Century Science 6s Technology, Fall 1999, Vol. 12, No. 3, pp. 54 - 61.



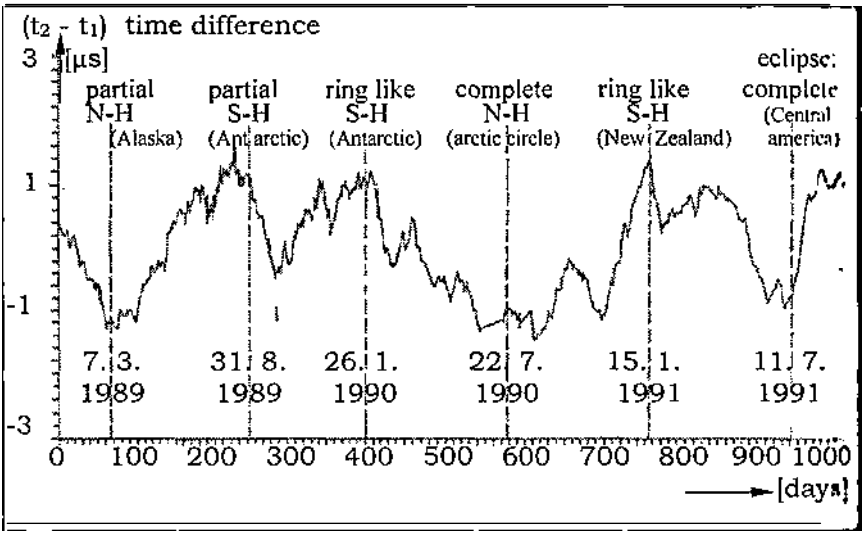


Fig. 20.15: Long-term measurement between 1989 and 991 of the difference in going of two atomic clocks at the U.S. Naval Astronomical Observatory.<i>

The in the 1000 days occurred eclipses of the sun have been entered later. In addition is recorded, if the northern hemisphere (N-H) or the southern hemisphere (S-H) of the earth was involved.

<i>:Shu-wen Zhou: Abnormal Physical Phenomena Observed When the Sun, Moon, and Earth are Aligned, 21st Century Science & Technology, Fall 1999, Vol. 12, No. 3, pp. 54 - 61. Figure 8.

A connection to the neutrino radiation Prof. Zhon doesn't draw, but it almost is obvious.

From the U.S. Naval Astronomical Observatory (LC/7970) long-term measurements over 1000 days between 1989 and 1991 are present (fig. 20.15). The difference in going between the two atomic clocks positioned at different places shows a permanent up and down. The reason goes as completely unknown.
But if the eclipses, which took place in this time, are entered then one immediately sees the assignment to a maximum or a minimum value. If an eclipse of the sun namely concerned the southern hemisphere of the earth, then the difference in going each time reached a maximum, but if the shadow of the moon run over the northern hemisphere, then each time a minimum occurred. Chance here probably is out of the question!

Let us record: The effect of an eclipse of the sun, to which for instance a Foucault pendulum reacts, can equally be traced back to the interaction of the neutrinos as the free energy. That's why the here presented book carries the title "Free energy and the interaction of the neutrinos". It has appeared in the series concerning the "Electromagnetic environmental compatibility", and also for that there are good reasons. Our energy technology must become more ecologically compatible and we come the goal closer, if we emulate nature, understand and copy it.

That it further concerns electromagnetism, likewise is explained from the interaction of the neutrinos, which concerns the oscillating and resonant case of the electromagnetic interaction. In this respect the reference to the series of books therefore would be given.

It only indirectly has to do with "electrosmog", or what otherwise is understood under environmental compatibility in general. It however could be shown that also the earth radiation is a form of neutrino radiation, and that it poses a biological effectiveness, after it turned out that it serves nature as an energy source. With that the conflict with space energy devices already is predetermined if the same scalar wave radiation should be used. Then one system takes away the other system the energy basis and the existence basis.
This environmental compatibility problem can be solved, if care is taken that both don't get in each others way with regard to the frequency and the wave length. We for that need a deep understanding concerning the topic of the space quanta and the neutrinos, their physical properties and the corresponding device technology. The book should make a contribution to that.

The other side of the medal is the information technical aspect of the scalar wave radiation and the environmental compatibility problem connected with that. The third and last part of the series of books is dedicated to this theme.

Part 2: Edition belonging to the energy technical seminar: "Electromagnetic Environmental Compatibility"

Prof. Dr.-Ing. Konstantin Meyl

Scalar waves

Abstract: 1. Auflage 1998, 4. Auflage and 1st English Edition

With regard to the environmental compatibility a decentralized electrical energy technology should be required, which manages without overhead power lines, without combustion and without radioactive waste. The liberalization of the energy markets won't on any account solve our energy problem, but only accelerate the way into the dead end. New, ecologically compatible concepts are collected and discussed in the book.

A useful energy source could be represented by space quanta, which hit upon the Earth from the sun or from space. They however only are revealed to the measurement technician, if they interact. It will be shown that the particles oscillate and an interaction or collection with the goal of the energy technical use only is possible in the case of resonance.

Since these space quanta as oscillating particles have almost no charge and mass averaged over time, they have the ability of penetration proven for neutrinos.
In the case of the particle radiation discovered 100 years ago by Tesla, it obviously concerns neutrinos. We proceed from the assumption that in the future decentral neutrino converters will solve the current energy problem. Numerous concepts from nature and engineering, like on the one hand lightning or photosynthesis and on the other hand the railgun or the Tesla converter are instanced and discussed.

Free energy and the interaction of the neutrino radiation

INDEL GmbH, Verlagsabteilung, Fax: +49-7721-51870
Tel: +49-7724-1770
Postal and ordering address:
l.TZS, Prof. Dr. K. Meyl, Leopoldstr. 1, D-78112 St. Georgen
www.k-meyl.de meyl@k-meyl.de

Scalar Waves

From an extended vortex and field theory to a technical, biological
and historical use of longitudinal waves.

Part 3

by

Professor Dr.-Ing. Konstantin Meyl

Edition belonging to the lecture and seminar "Electromagnetic environmental compatibility"

(Original title: "Elektromagnetische Umweltvertraglichkeit")

Translated out of the German language
by Ben Jansen
(2003)

* * *

Part 3: Edition belonging to the information technical seminar

Scalar waves and the technical use of longitudinal waves and vortices

* * *

INDEL GmbH, Verlagsabteilung

Villingen-Schwenningen 2003

ISBN 3-9802 542-4-0

Preface to the seminar, part 3

With the appearing in print of the 3rd part of the series of lecture notes of the electromagnetic environmental compatibility, the collection of material can be considered to be completed for the time being. By now almost all aspects concerning the theme of the potential vortices of the electromagnetic field and their propagation as a scalar wave should have been addressed or at least indicated.
And that's what it is about in the case of the editions belonging to the seminars: In the seminars, taking place inside and outside the university, questions about the phenomena and the biological effectiveness of the fields, which surround us, are discussed. The scientifically correct procedure asks as a preparation for the seminar a voluminous collection of material and a compilation of theses with the pros and contras to them. The argumentation, which is denoted as „textbook physics" and is generally accepted, the participant of the seminar can work out himself by means of the available journals and books. The potential vortex, which completed the field equations, however makes possible a counterstatement, which for most participants at first will be unusual. The old dispute between quantum and field physics rekindles. What is missing is a voluminous collection of material concerning the refined field physics, and this gap the editions belonging to the seminars should close.
In the case of this book the primary concern is to make sure, that all facets, properties and physical consequences of the new and unified field physics are addressed. The question, if all points can bear a strict verification, remains reserved to the seminar and its participants, of whom each should form its own judgement. The series of books should be understood as a stimulation, to make own thoughts about the various points. Who has no opportunity to participate in a seminar, by means of the lecture at least gets an idea of what is discussed here and how is struggled for scientific insights.
The herewith completed collection of material by no means may be compared or confused with a basic work about the theory of objectivity. That the editions cannot and want not afford at all. They together with the discussions at best form the basis for a scientifically basic work, at which I am working.

In the case of the collection of material concerning the electromagnetic environmental compatibility consisting of three parts, again and again new aspects have emerged, which found entrance into the book, at which I was working at that particular time, whereas the rough structure has been controlled precisely: part 1 with the chapters 1 to 9 treats the basics, part 2 with chapters 10 to 20 the energy technical aspect and part 3 with the chapters 21 to 30 the information technical aspect of scalar waves.
The here presented 3rd part starts with the wave equation and the two comprised parts of a transverse and a longitudinal wave. The historic dispute between Heinrich Hertz and Nikola Tesla with the experimental evidence of the each time used wave part is continued over the wave-particle uncertainty compromise up to the dispute about the right field description: that of Maxwell or the new dual and at the same time unified description, which builds upon Boscovich and Faraday. The aspects, which seem so irreconcilably thereby only are two parts of a single equation, which is much older and can be traced back to Laplace: the wave equation.
Until now no derivations of this equation, which contains both wave parts, are known This for the first time succeeds from the new and extended field approach in the summary from chapter 26. At first however is attempted to make the world of the scalar waves

plausible with models, calculations and observations. For that are used examples from high-frequency engineering, like the ground wave or the near-field area of an antenna, and from nature and medicine, which are granted two chapters. The comparison of the nerve conduction with Tesla's one wire technology is bringing it to light that scalar waves equally are used in both cases. In a frequency diagram the insights are entered concisely and is shown that considerably more unexplored domains occur than already is known, that in most cases not even gauges are available. With the design for building a scalar wave gauge the scientific verification of until now only empirically won results is stimulated, like for instance the results the radiesthesia wants to have determined with the help of the sensitivity of man as a biosensor.

Many relations will be revealed to the reader only, if he has worked through the summary, which follows. From Maxwell's field equations only the well-known (transverse) Hertzian waves can be derived. (Longitudinal) scalar waves however in the result are zero. This is a flaw of normally used field theory, since scalar waves exist for all particle waves, like e.g. as plasma wave, as photon- or neutrino radiation. Because the field pointer, in the direction of which longitudinal waves are propagating, is oscillating, the frequency will oscillate like the velocity of propagation, which again is measured as a noise signal. Any antenna noise proves the emission of scalar waves in space. But scalar waves, or whatever should be subsumed under the by mathematics minted generic term free of any value judgement, surely are more than only noise.

Starting from Faraday's discovery - instead of the formulation of the law of induction according to Maxwell - an extended field theory is derived, which goes beyond the Maxwell theory with the description of potential vortices (noise vortices) and their propagation as a scalar wave, but contains the Maxwell theory as a special case. The new field theory with that doesn't collide with the textbook opinion, but extends it in an essential point with the discovery and addition of the potential vortices.
Also the theory of objectivity, which follows from the discovery, is compared in the form of a summary with the subjective and the relativistic point of view and the consequences for variable velocity of propagation of the scalar waves, formed from potential vortices, are discussed. Like already in part 1 the unification of the electromagnetic interaction with the gravitation succeeds impressively.

Besides the mathematical calculations this book contains a voluminous material collection concerning the information technical use of scalar waves, if e.g. the useful signal and the usually interfering noise signal change their places, if a separate modulation of frequency and wavelength makes a parallel image transmission possible, if it concerns questions of the environmental compatibility for the sake of humanity (bioresonance, among others) or to harm humanity (electrosmog). With that the book again finds back to the starting point, to the open task, which made necessary an excursion through all domains of physics to answer it. I hope, the long march was worthwhile.

Villingen-Schwenningen december 2002

Preface to the 2nd edition of part 3

In favour of chapter 30 as a complement, an introduction into the ancient broadcasting technology of the gods, the 1st edition wasn't printed anymore in the year 2002 as originally planned. Instead the individual chapters have been prepublished in different places. The chapters 21 to 25 are found among others in the book "scalar wave technology", which has been published as an instruction for an experiment to demonstrate scalar waves in 2001. Excerpts from it, as also from the chapters 26 to 28 have appeared in form of individual essays in different journals.

Again experimental successes had been intervening, which caused a renewed deferring of the date of appearance of the 3rd part of the series of books. In my laboratory the bi-directional transmission of music and of data by scalar wave was successful. We thus also can transmit information backwards from a receiver to the transmitter or to a second receiver, whereby the receivers work purely passive, thus without own power supply. The operating energy is as well supplied to them by the transmitter by scalar wave. The demonstrated technology opens completely new possibilities of a technical application. Conceivable are telemetry installations where measurement signals have to be transmitted from rotating or otherwise inaccessible places of a machine. The energy for the measurement electronics can be transmitted wirelessly by scalar waves and the signal can be sent back along at the same time, by modulating it onto the energy carrier. In this way dozens of measurement stations can be connected wireless with a single central transmitter, which supplies them all with energy.

The question was asked: Is the technology really entirely new? The answer is amazing: No, it here concerns the oldest technology of humanity, which had developed to a peak in antiquity, to send receive engineering of the gods. For this claim even a mathematical proof is available. For that the authoritative transition, the unrolling of a vortex to a wave (the transition from the near-field to the far-field) or in the reversed case the rolling up at a receiver antenna (usually denoted as standing wave) is calculated with help of the extended field theory. The result is, that at this transition the velocities of propagation resp. the wavelengths of the transverse and the longitudinal wave stand to each other in the ratio of the Golden Proportion.
With regard to the optimization of a transmitter or receiver antenna the Golden Proportion has an effect on the construction resp. the architecture of corresponding buildings . Which ones, with that deals the complementing chapter 30. But it mustn't be missing either, since after all it concerns a grandiose practical information technical use of scalar waves, from which we technologically can learn a lot[<i,ii>].

Villingen-Schwenningen march 2003

<i>: Note: chapter 30 provides an introduction into ancient broadcasting technology of the gods. The working off of history with respect to the use of scalar waves is so voluminous, that for that a book of its own is published with the title:

<ii>: K. Meyl: Sendetechnik der Gotter, historischer Sciencefictionroman (2003), Villingen-Schwenningen, INDEL Verlagsabteilung, ISBN 3-98O2 542-5 9

21. Derivation of the scalar wave

WilliamThomson, who called himself Lord Kelvin, after he had been knighted, already in his lifetime was a recognized and famous theoretical physicist. The airship seemed him too unsafe and so he went aboard a steam liner for a journey from England to America in the summer of 1897. He was on the way in a delicate mission.

Eight years before his German colleague Heinrich Hertz had detected the electromagnetic wave in experiments in Karlsruhe and scientists all over the world had rebuilt his antenna arrangements. They all not only found confirmed the wave as such, they even could show the characteristic properties.
It was a transverse wave, for which the electric and the magnetic field pointers oscillate perpendicular to the direction of propagation. This can be seen as the reason, that the velocity of propagation is showing itself field independent and constant. It is the speed of light c.

With that Hertz had experimentally proven the properties of this wave, previously calculated in a theoretical way by Maxwell, and at the same time proven the correctness of the Maxwellian field theory. The scientists in Europe were just saying to each other: "well done!" as completely other words came across from a private research laboratory in New York: "Heinrich Hertz is mistaken, it by no means is a transverse wave but a longitudinal wave!"

Such a screwball most said and did as if they hadn't heard the criticism at all. But then one couldn't ignore it completely, because on the one hand claimed the private research scientist to have experimental proof and on the other hand it wasn't just anybody, who here reported. It was nobody but Nikola Tesla, the Croat experimental physicist who emigrated to America
Him we owe the modern alternating current technology from the high-tension network for energy transmission over the alternating current transformer to the asynchronous machine.
With his magnificent inventions he had earned enough money, to be able to afford a private laboratory, in which he could research and invent uncensored and free. The key to his success was lying in his purposeful, concentrated and efficient working method.
He was fast! Whereas in Europe still was being discussed about properties and theoretical possibilities of application of the wave, Tesla already presented the armed forces a remote controlled scaled-down submarine in Madison Square Garden (fig. 21.1 A). To convince such a man, who only holds valid what his experiments reveal, from the opposite, should be a hopeless enterprise.
Lord Kelvin was aware of that, as he made the decision to go on the journey. He could not and did not want to put his head into the ground, as many of his colleagues, because on the one hand scientists are curious by principle and on the other hand he travelled as an official representative of science. He had been instructed to free, as Mr. Clean, the undamaged world of sciences from erroneous teachings. But it came completely different.

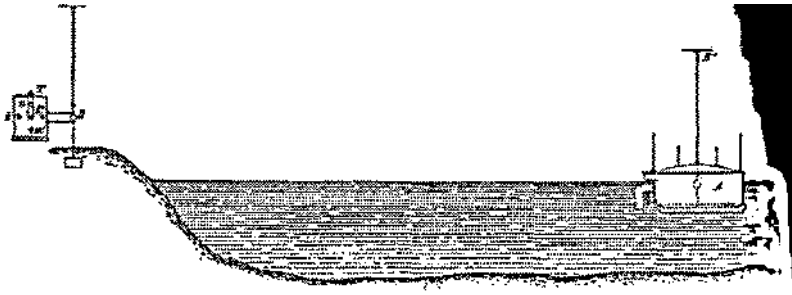


Fig. 21.1 A: The first radio remote control of the world.<i>

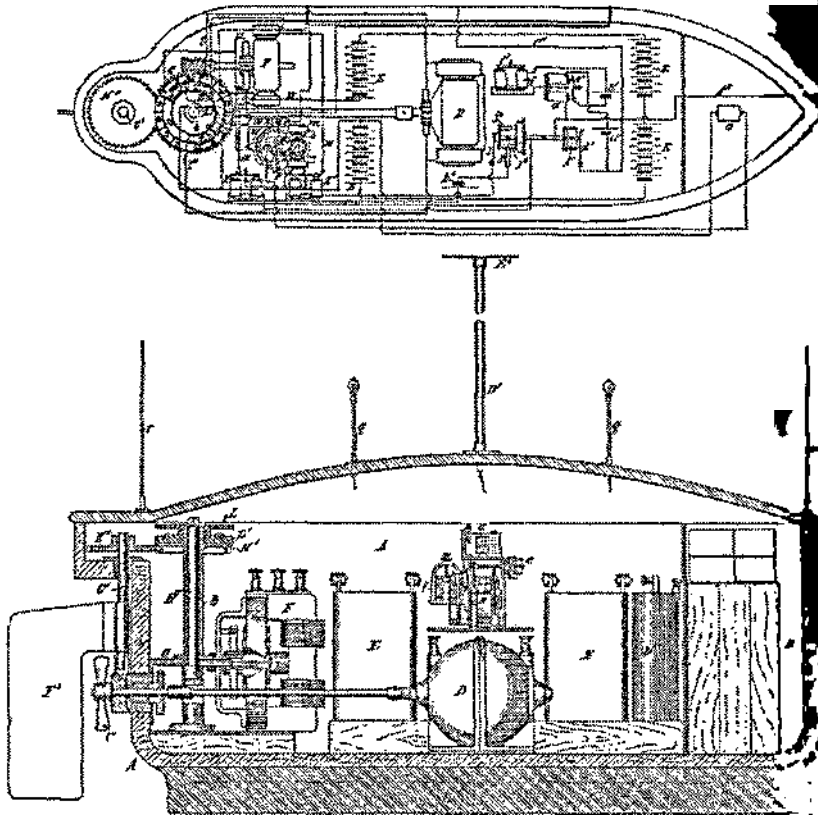


Fig. 21.1 B: Patent specification concerning the remote controlled submarine.<i>

<i>: Nikola Tesla: Method of and Apparatus for Controlling Mechanism of Moving Vessels or Vehicles, US-Pat. 1898, Nr. 613,809. Complete Patents: P. 351

21.1 Lord Kelvin in a delicate mission

The first day of his visit at Tesla Kelvin spoke the admonishing words he had been instructed to speak. He recommended Tesla warmly to publicly retract the remarks concerning the Hertzian mistake and to contribute himself to the settlement of the dispute. Seen from a specialist viewpoint they talked at cross-purposes.

But at night in his hotel room the Lord again thought about the experiments, which had been shown to him. The standing wave nature had been visible unambiguously: the oscillation nodes, the effect back on the transmitter, the high degree of effectiveness and many other things more. Such properties the Hertzian wave indeed doesn't know. Also Tesla didn't work with dipole antennas, but with flat coils, with spark gap oscillators and with a very unconventional switching technique, set up different in principle.

The next morning Lord Kelvin appeared in the laboratory again and greeted Tesla with the words: "Then you don't use Hertzian waves?" "Certainly not", Tesla answered," it are radiations. By waves no energy could be economically transmitted over a larger distance. My system works with true conduction, which theoretically seen can take place over a larger distance, without bigger losses occurring."
In the article of the "Electrical Experimenter" is noted further, that the doubting critic Kelvin suddenly turned into one of the biggest followers<i>.

Kelvin deduced very fast: according to that there exist two different sorts of wave propagation. So Hertz with his transverse wave is just as right, as Tesla with the longitudinal wave.
As a represantative of theoretical physics he however could pull out Tesla a decayed tooth. Maxwell had based his field description on an aether concept, which at that time in the world of sciences triggered violent discussions. Since Tesla saw such an aether as a prerequisite for longitudinal waves, he thought he and not Hertz had proven the Maxwell wave in experiment for the first time. By stating this the magnificent experimental physicist however revealed weaknesses in the area of theory. Maybe he had not read exact enough or understood the books of Maxwell, which without doubt were formulated mathematically only arduously comprehensible in the original version.
In this point Tesla had to learn otherwise by Kelvin. Maxwell's field theory provides without exception a mathematical description for the Hertzian wave. For the Tesla radiation however no field description exists! This by the way is the circumstance, why this wave could disappear from the textbooks and again fall into oblivion. Tesla himself had problems to theoretically imagine, what happens at his wave. His models in some points perhaps were even better than the official textbook opinion, but not without contradiction to accepted regularities. That's why Tesla did without a publication of his ideas, although he in his lifetime had filed away at an own theory.

<i>: Nikola Tesla: Famous Scientific Illusions, III. The Singular Misconception of the Wireless, Electrical Experimenter, Feb. 1919, printed in Tesla Said, p. 197

Figure 21.2 A:
William Thomson, 1846 becoming Professor at Glasgow University with the age of 22 years. From 1892. on he was called Lord Kelvin.<i>

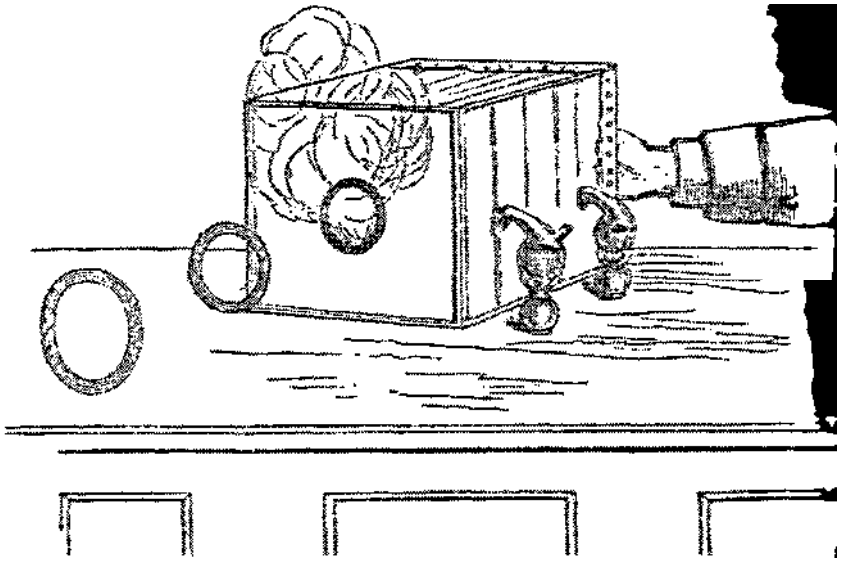


Fig. 21.2 B: Vortex rings from a smoke vortex gun.<i>

<i>: David Ash, Peter Hewitt: Science of the gods, Gateway Books, Bath, 1990

21.2 Helmholtzian ring-like vortices in the aether

Tesla told Kelvin at his visit from the meeting with the German Professor Hermann von Helmholtz on the occasion of the World's Fair in Chicago 1893. Kelvin knew him very well and had cooperated with him in the past. Now the vortex concept of his colleague and his model of stable vortex rings were very obliging.
In the case of a standing wave the impulse is passed on from one particle to the next. In the case of acoustics for instance we are dealing with a shock wave, where one air molecule knocks the next. In this way sound propagates as a longitudinal wave. Correspondingly the question is raised: What sort of quanta are the ones, which in the case of the Tesla radiation carry the impulse?

Lord Kelvin was already on the way back to Europe on the steamship and he deduced: The Tesla experiments prove the existence of longitudinal standing waves in space. In the question, what passes on the impulse, Kelvin comes to the conclusion: it are vortices in the aether! With that he had found an answer in experience. With his students he built boxes, with which he could produce smoke rings, to be able to study and demonstrate in experiments the special properties of ring-like vortices in their flow technical analogy (fig. 21.2<i>). But he didn't have ready a suitable field theory.

The from Germany to the Isles exported vortex physics for a short time could establish in England, before it was slaughtered and buried by the German quantum physicists. A main advocate has been James Clerk Maxwell, who held the vortex theory for the best and most convincing description of matter<ii>. As his successor at the Cavendish laboratory in Cambridge J. J. Thomson was appointed, who already as a young man had got a price for a mathematical treatise about vortices<iii>. He discovered the electron and imagined it, how could it be otherwise, as a field vortex.

The crucial weakness of vortex physics, the lacking of an usable field theory, was of benefit to the emerging quantum physics. This could change fundamentally with the discovery of the potential vortex, the vortex of the electric field<i4>!
In addition is the experimental proof of a vortex transmission as a longitudinal wave in air or in a vacuum, as it has been furnished by Tesla already 100 years ago, neither with Maxwell's theory nor with the today normally used quantum theory explicable or compatible. An urgent need is present for a new field theory!

<i>: David Ash, Peter Hewitt: Science of the gods, Gateway Books, Bath, England 1990.

<ii>: James Clerk Maxwell: "...the vortex rings of Helmholtz, which Thomson imagines as the true form of the atom, fulfil more conditions than any other previous concept of the atom."

<iii>: J.J. Thomson: "the vortex theory is of much more fundamental nature than the usual theory of solid particles."

<i4>: Konstantin Meyl: Potentialwirbel Band 1 (1990) and Band 2 (1992), INDEL-Verlag, Villingen-Schwenningen.

Scalar waves, a mathematical reasoning (I)

1. prerequisite: wave equation (textbook-formulation)

$$\Delta \mathbf{E} = \frac{1}{c^2} \cdot \frac{\delta^2 \mathbf{E}}{\delta t^2}$$

taking apart of the delta operator mathematically (Laplace operator) according to the rules of vector analysis (fig. 5.0):

$$\begin{array}{lll} \Delta \mathbf{E} & = & \text{grad div } \mathbf{E} - \text{rot rot } \mathbf{E} \\ \text{wave} & = & \text{longitudinal} + \text{transverse} \end{array} \quad (21.1)$$

---

2. State of the art of technology: Hertzian wave = transverse wave
special case: = solution of Maxwell's field equations
no sources:

$$\text{div } \mathbf{E} = 0 \quad \text{and} \quad -\text{rot rot } \mathbf{E} = \frac{1}{c^2} \cdot \frac{\delta^2 \mathbf{E}}{\delta t^2} \quad (21.3)$$

transverse wave:
field pointers oscillate crosswise to the direction of propagation
The propagation occurs with the speed of light c.

---

3. claim: Tesla radiation = longitudinal wave
special case:
irrotationality:

$$\text{rot } \mathbf{E} = 0 \quad \text{and} \quad \text{grad div } \mathbf{E} = \frac{1}{c^2} \cdot \frac{\delta^2 \mathbf{E}}{\delta t^2} \quad (21.4)$$

longitudinal wave, shock wave, standing wave:
field pointer oscillates in the direction of propagation.
Velocity of propagation is variable!

Fig. 21.3: The special cases of the wave equation

21.3 Taking apart of the wave equation

Before one plunges into the adventure of an entirely new field theory, it first of all should be traced and analysed, what the latest textbooks say about scalar waves.

There some scalar or vector potentials are introduced; there the constant of dielectricity e is written down as a complex variable, although it physically seen concerns a material constant, only to be able to calculate with this trick artificially a loss angle, which should indicate the losses occurring in a dielectric, where in reality it concerns vortex losses. Of course one can explain the dielectric losses of a capacitor or the heating in a microwave oven entirely without vortex physics with such a label fraud, but it should be clear to anyone, that in a complex constant lies buried an inner contradiction, which is incompatible with physical concepts.
We are used to such auxiliary descriptions so much, that the majority of today's physicists tend to attribute physical reality to this mathematical nonsense. As pragmatists they put themselves on the standpoint if with that experimental results can be described, then such an auxiliary description can't be so wrong after all. Doing so the circumstance is forgotten that here the ground of pure science is abandoned and is replaced by creeds.

We find everything already in the wave equation, as it can be found in all textbooks.

$$\Delta \mathbf{E} = \frac{1}{c^2} \cdot \frac{\delta^2 \mathbf{E}}{\delta t^2} \qquad (21.1)$$

Behind this formulation two completely different kinds of waves are hiding, because the used delta operator consists of two parts according to the rules of vector analysis:

$$\underbrace{\text{grad div } \mathbf{E}}_{\text{longitudinal}} - \underbrace{\text{rot rot } \mathbf{E}}_{\text{transverse wave}} = \Delta \mathbf{E} \qquad (21.2)$$

We want to discuss two special cases.
If we put the left part (in eq. 21.2) to zero (div E = 0) which is tantamount to no sources of the field then the well-known radio wave remains, which also is called Hertzian wave, after Heinrich Hertz, as said, had experimentally detected it in Karlsruhe 1888:

$$\text{div } \mathbf{E} = 0 \qquad \text{and} \qquad -\text{rot rot } \mathbf{E} = \frac{1}{c^2} \cdot \frac{\delta^2 \mathbf{E}}{\delta t^2} \quad \text{(special case)} \qquad (21.3)$$

It concerns the transverse wave, described by Maxwell, for which the field pointers oscillate crosswise to the direction of propagation. The propagation again occurs with the speed of light c. So much concerning the state of the art of technology.
But as we see, in the mathematical formulation of the wave equation is hiding, yes, even more than only the generally known electromagnetic wave. The no sources approach is a neglect, which only is valid under certain prerequisites!

Scalar waves, a mathematical reasoning (II)

3. claim: Tesla radiation = longitudinal wave

$$\text{rot } \mathbf{E} = 0 \quad \text{and} \quad \text{grad div } \mathbf{E} = \frac{1}{c^2} \cdot \frac{\delta^2 \mathbf{E}}{\delta t^2} \tag{21.4}$$

special case:
source field, because div E ≠ 0

=> sources = charge carriers (plasma waves)
=> sources = vortex structures

---

4. approach: (div E ≠ 0) is a scalar! => scalar wave
=> E-field vector can be derived from a scalar potential φ:

$$\mathbf{E} = -\text{grad } \varphi \tag{21.5}$$

and

$$\text{div } \mathbf{E} = -\text{div grad } \varphi \equiv -\Delta \varphi \tag{21.6}$$

inserted in eq. 21.4: homogeneous scalar wave equation

$$\Delta \varphi = \frac{1}{c^2} \cdot \frac{\delta^2 \varphi}{\delta t^2} \tag{21.7}$$

---

5. proof: For the case of an additional space charge density ρ_{el} should be considered: div D $= \rho_{el}$
and div E $= \rho_{el}/\varepsilon$ (21.8)

inhomogeneous scalar wave equation = plasma wave!

$$\Delta \varphi = \frac{1}{c^2} \cdot \frac{\delta^2 \varphi}{\delta t^2} - \frac{\rho_{el}}{\varepsilon} \tag{21.9}$$

Fig. 21.4: Derivation of the plasma wave as an example of a scalar wave

21.4 Derivation of the scalar wave equation

Making neglects by all means is normal and legal in science. But it may not be carried out at will and untested. In any case an error consideration is necessary, the result of which should be, that the neglect indeed is sufficiently small.
In the here presented case of the wave equation I haven't found one single textbook, in which this error consideration has been carried out. As a result of this inexcusable negligence there is the danger that exactly the aspect is neglected, which it actually concerns. This could lead to catastrophical results, e.g. that the causes for electrosmog, for numerous EMC-problems, for biological and technical effects aren't seen and understood anymore, that pure science once more dilapidates to a creed!

In the case of the wave equation the assumption of no sources describes only one side of the medal. The other side, which for the electromagnetic wave occurs as an error term, we get if we this time put the right part in equation 21.2 to zero (rot E = 0).
In this case a divergence of the field is present, which requires a source field. As sources some charge carriers, quanta or at least particle structures, e.g. vortex structures have to exist. Their propagation occurs, as we know it from the sound propagation, as shock wave in longitudinal manner. The air molecules, the quanta or particle structures thereby oscillate in the direction of propagation. Also the field pointer has a component in this direction

$$\text{rot } \mathbf{E} = 0 \qquad \text{and} \qquad \boxed{\text{grad div } \mathbf{E} = \frac{1}{c^2} \cdot \frac{\delta^2 \mathbf{E}}{\delta t^2}} \quad \text{(special case)} \qquad (21.4)$$

The occurring divergence of the field pointer (div E) is a scalar, for which reason this wave preferably is called scalar wave.

In the special case of a scalar wave (rot E = 0) the E-field vector can be derived from a scalar potential φ:

$$\boxed{\mathbf{E} = -\text{grad } \varphi} \quad (21.5)$$

On the one hand this term is used in the wave equation 21.4 on the right-hand side without forming the gradient on both sides of the equation. On the other hand the divergence of the approach 21.5:

$$\text{div } \mathbf{E} = -\text{div grad } \varphi \equiv -\Delta \varphi \qquad (21.6)$$

is applied in equation 21.4. The result is the homogeneous scalar wave equation:

$$\boxed{\Delta \varphi = \frac{1}{c^2} \cdot \frac{\delta^2 \varphi}{\delta t^2}} \quad (21.7)$$

Scalar waves, a mathematical reasoning (III)

Proof: plasma wave =
inhomogeneous scalar wave equation

$$\Delta \varphi = \frac{1}{c^2} \cdot \frac{\delta^2 \varphi}{\delta t^2} - \frac{\rho_{el}}{\varepsilon} \quad (21.9)$$

one solution<i>: $\omega^2 = c^2 \cdot k^2 + \omega_p^2$ (= Langmuir waves).

Fig. 21.5 A: Derivation of the plasma wave as an example of
the existence of scalar waves in the wave equation

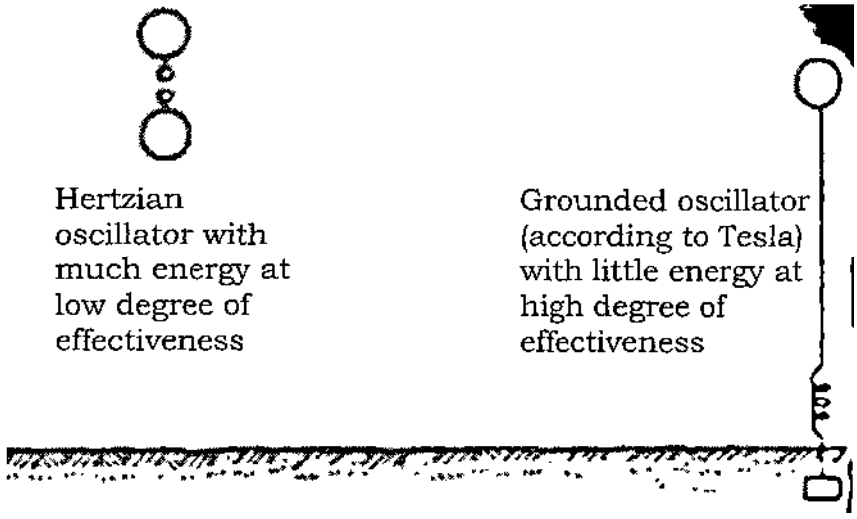


Fig. 21.5 B: Nikola Tesla explains the difference between his
radiation and the Hertzian wave.<ii>

<i>: The solution describes dispersion relations of plasma waves; longitudinal wave movements + Langmuir oscillations of the electron density.

<ii>: Nikola Tesla: The Problem of Increasing Human Energy, The Century Monthly Magazine, June 1900, ISBN 1-882137-00-0, Page i-15

21.5 Derivation of a plasma wave

Doing without formation of the gradient for the derivation of the homogeneous wave equation is tantamount to an integration of the equation. We hence under certain conditions must expect the occurring of an integration constant.
This is the case, if in addition a space charge density ρ_{el} occurs as source of the field, which according to Maxwell equation 4 can be considered as the divergence of a dielectric displacement D (fig. 21.4):

$$\operatorname{div} \mathbf{D} = \rho_{el},$$

resp. with the relation of material $\mathbf{D} = \varepsilon \cdot \mathbf{E}$:

$$\operatorname{div} \mathbf{E} = \rho_{el}/\varepsilon \equiv -\Delta \varphi. \qquad (21.8)$$

If we complete this contribution with possible present field sources, then the inhomogeneous scalar wave equation results:

$$\boxed{\Delta \varphi = \frac{1}{c^2} \cdot \frac{\delta^2 \varphi}{\delta t^2} - \frac{\rho_{el}}{\varepsilon}} \qquad (21.9)$$

For these equations solutions have been published<i>. They have the same form, as the well-known dispersion relations of Langmuir waves. That is electron plasma waves, thus longitudinal wave movements associated with Langmuir oscillations of the electron density.

With that it has been proven that scalar waves and longitudinally propagating standing waves are described by the wave equation and are contained in it. This in any case is valid in general just as in the special case of a plasma wave, as mathematically could be derived here.

From the example of the derivation of plasma waves from the wave equation 21.1, we see that scalar waves by all means are known and their existence isn't casted doubt on at all. After all the mathematically won solution is secured by numerous experiments. Why do textbooks concerning high-frequency engineering then ignore the scalar wave parts in the wave equation?
Our specialists seem to concentrate so much on their branch, that they are losing the view on the Big Whole. They practice one-eyed physics, where the plasma physicist keeps one eye shut and the radio technician the other eye. What the other one does and researches, they don't understand anymore for ages. It is necessary to point them to their common root.

The perhaps most important statement of the wave equation is that every emitted wave contains both longitudinal and transverse parts! Both parts in addition occur jointly, so that for corresponding boundary conditions it can be expected that one part is transforming into the other part. The HF technician then suddenly measures less field strength and comes to the conclusion that his radio wave has been damped or partly absorbed. Doing so heat is created, he says, although the wave equation by no means contains a corresponding term for the necessary thermodynamic description. He simply hasn't understood the wave equation!
Absorption means nothing but transverse waves in the case of a disturbance rolling up to vortices, to become a scalar wave in this way (fig. 1.4 and 5.3). With that they are evading every field strength measurement and what can't be measured doesn't exist in one-eyed physics! Therefore can't exist, what shouldn't exist.

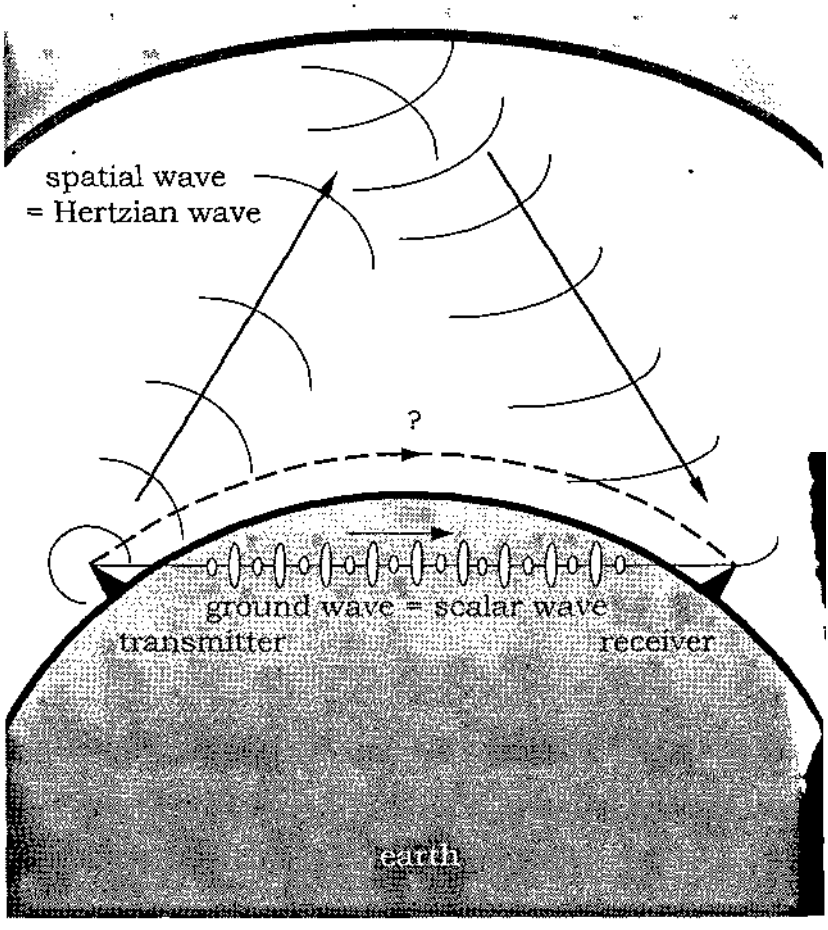


Fig. 21.6: Ground waves, which follow the curvature of the earth and radio waves reflected at the ionosphere.<i>

<i>: Meinke, Gundlach: Hochfrequenztechnik, 4.Aufl. Springer-Verlag Berlin 1986, Seite R 18: ,,Lang-, Mittel- and Kurzwelle breiten sich einerseits entlang der Erdoberflache als Bodenwellen, andererseits unter Mitwirkung der Ionosphare als Raumwellen aus."

21.6 Mistakes of the HF technology

The devastating judgement of Tesla, Hertz was mistaken, was rash. His claim of having detected the Maxwell wave himself, proved to be untenable. With this claim in particular Tesla hud the scientific world against him. If one opens encyclopedias or textbooks then one gets the impression, until the day of today science still hasn't forgiven Tesla, what once more shows how persistent prejudices are kept.

Just as little does a verdict of the American Supreme Court justice to the true circumstances, with the decision of the highest judges that Tesla and not Marconi is entitled the right to be the inventor of the radio. As we see, have both inventors in reality used completely other kinds of waves. The available transmitters of 100 years ago we would from today's viewpoint call „broadband dirt slingers". These spark flying monster have blown both parts of the wave equation, the transverse as well as the longitudinal part, into the air to ample extent. What distinguished the wave pioneers was their receiver technique, was eventually the question, which wave part they have filtered and utilized.

Marconi worked with dipole antennas, as already Heinrich Hertz. With that both could preferably track down and detect the radio wave. So they also should be entitled the right to be pioneers of radio technology. The verdict of the highest judges doesn't justice to this circumstance and should rather be judged as a nationalistically coloured political issue. Tesla however worked with two spherical electrodes, in which he preferably replaced one electrode by the globe, by grounding his devices. In this way he could receive the scalar wave parts. But that are not radio waves! Scalar waves have completely other properties, one even could be inclined to call them opposite properties.

To improve the degree of effectiveness of the transmission stretch one naturally was trying to also optimise the transmitting installation with regard to the respectively used wave part. Tesla optimised the scalar wave part and could record reactions of biological beings. His part represents a set of difficulties of the environmental compatibility, which should be taken serious. In the beginning the Marconists on the ships, as the radio operators were called, suffered from the so-called radio operator disease, which is unsolved until today. This phenomenon only disappeared after the radio devices on board had been optimised in favour of the used radio wave. The reached and measuring technically verifiable increase of the degree of effectiveness, primarily obtained by an improved antenna adjustment, simultaneously means a reduction of the scalar wave part, which endangers health.

But a received signal hides the receiver technician, if it has been on the way as a transverse or as a longitudinal wave. The coupling in one and the same equation leaves open both possibilities. Every radio amateur knows the so-called ground waves, which arrive faster at the receiver, than the Hertzian waves mirrored at the ionosphere, which propagate in a straight line. Allegedly the ground waves follow the curvature of the earth<1>, so it is written in expert books. This explanation hurts, since who can see along the curvature of the earth with a pair of field glasses. He would see the back of his head! No, the explanation the ground waves would run along the earth's surface is pure nonsense. The interference and the fading with which the radio amateur is fighting, are a result of the differently fast arriving wave parts, and doing so the scalar wave part tunnels as a straight line right through the earth (fig. 21.6)!

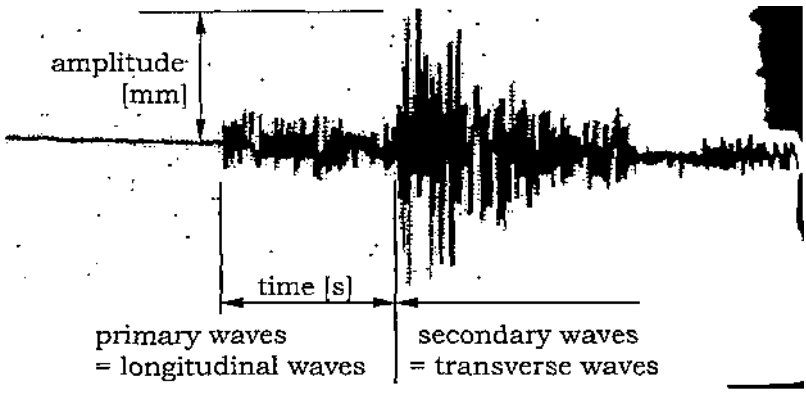


Fig. 21.7 A: Longitudinal and transverse earth quake waves.

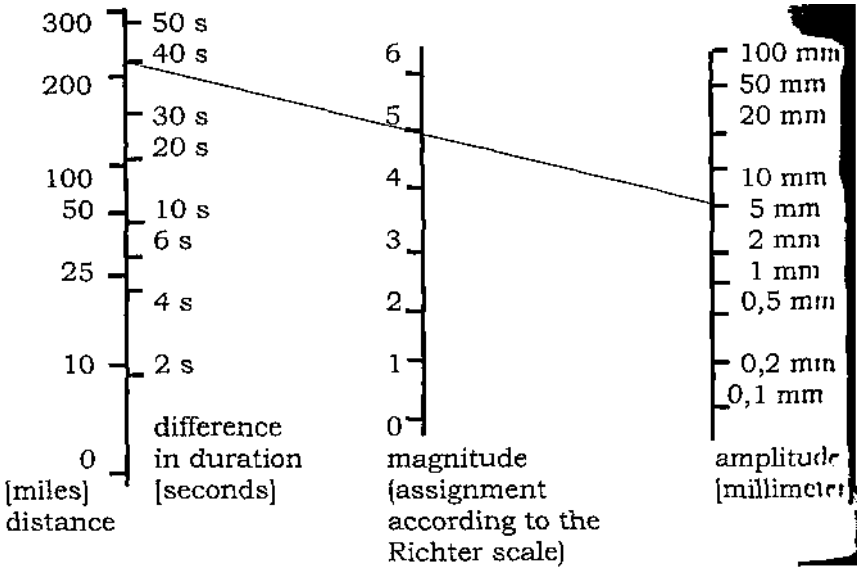


Fig. 21.7 B: Analysis according to the Richter scale.
(e.g.: 40 s duration between S- and P-waves for 5 mm amplitude means an earthquake of strength 5 in a distance of 220 miles.)

21.7 Coupling of the wave parts

The set of difficulties of ground waves makes clear the coupling of longitudinal and transverse waves as two aspects or parts of a wave. As the corresponding equation 21,1 mathematically taken apart into 21.2 dictates, does every transmitter emit both parts.

Exactly this circumstance the owners of allotments have used, which directly near a transmitter had illuminated their estate with freely hung up fluorescent lamps. The transmitter runners after that wanted to present them the power bill.and they could obtain, that this kind of illumination technique was prohibited.
Nowadays anyone may operate a high-frequency technical installation, even if he hasn't understood at all the wave equation used by that. Actually one should have been grateful to the allotment owners, if they withdraw the scalar wave radiation, which is incompatible with the environment and biologically harmful, with their fluorescent lamps. Taken exact it even is the task of the transmitting technician to pay attention to it. that only radio waves are sent into the air, since only those should be used. The time has come to reverse the burden of proof to protect the environment, nature, the consumer and the unasked and not involved persons, which are irradiated.

From other areas, for instance from flow dynamics or for body sound is generally known that both wave parts exist and in addition occur jointly. In the case of a propagation through the earth, like for an earthquake, both parts are received and utilized. Because their propagation is differently fast, the faster oscillations arrive first and that are the longitudinal ones. From the time delay with which the transverse waves arrive at the measurement station, the distance to the epicentre of the quake is determined by means of the different velocity of propagation. For geophysicists this tool is part of everyday knowledge (fig. 21.7).

Only who keeps one eye shut, could mean that the electromagnetic wave is purely transverse and sound purely longitudinal. It is true that a transverse sound wave doesn't get too far in air, for which reason sound as a rule is considered as a purely longitudinal wave by neglecting this part, but such a neglect may not be carried out in general, it must be checked if it is legitimate from case to case and an error consideration should be carried out.

Further examples for the coupling of the wave parts are furnished by the latest tunnel experiments. Here so-called pure transverse waves are sent into a tunnel, through which they don't fit through at all. The Maxwell-theory then dictates that behind the tunnel no signal should be measurable.
But a signal is being measured, which in the tunnel in addition was faster than allowed.

In conferences again is being discussed about the wave equation. The imagination of the specialists reaches from phase velocities of an electromagnetic wave, which isn't present at all up to instantaneous tunnelling, during which the clocks should stop<i>.
The wave equation however supplies the only possible answer: The tunnel filters out the scalar wave parts and lets pass from them only those, which are sufficiently small and correspondingly fast!

<i>: see Part 1, Chapter 6.14

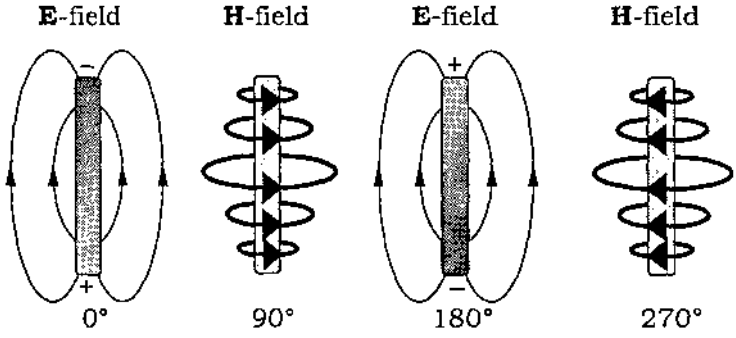


Fig. 21.8 A: The fields of the oscillating dipole antenna

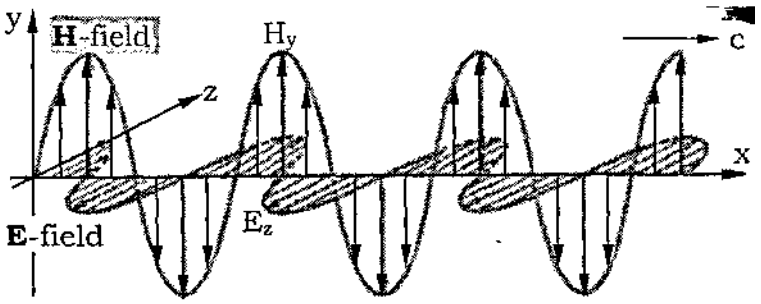


Fig. 21.8 B: The planar electromagnetic wave in the proximity

<i>: Zinke, Brunswig: Lehrbuch der Hochfrequenztechnik, 1. Bd., 3. Aufl. Springer-Verlag Berlin 1986, Seite 335

<ii>: dpa-message in the Sudkurier of 25.11.2000: „Gefahr furs Herz" (Translated:) Patients with a cardiac pacemaker produced in the Netherlands have been warned by the producer of the device (Vitatron) to be careful when passing anti-theft installations in stores. For devices, which were implanted between 1992 and 1998, there is the danger of the implant failing.

21.8 Set of difficulties of the near-field

In high-frequency technology is distinguished between the near-field and the far-field. Both have fundamentally other properties.

Heinrich Hertz did experiment in the short wave range at wavelengths of some meters. From today's viewpoint his work would rather be assigned the far-field. As a professor in Karlsruhe he had shown that his, the electromagnetic, wave propagates like a light wave and can be refracted and reflected in the same way. It is a transverse wave for which the field pointers of the electric and the magnetic field oscillate perpendicular to each other and both again perpendicular to the direction of propagation. It hence would be obvious, if in the case of the Hertzian wave it would concern the far-field. Besides the propagation with the speed of light also is characteristic that there occurs no phase shift between E-field and H-field.

In the proximity it looks completely different. The proximity concerns distances to the transmitter of less than the wavelength divided by 2*pi. Nikola Tesla has broadcasted in the range of long waves, around 100 Kilohertz, in which case the wavelength already is several metres. For the experiments concerning the resonance of the earth he has operated his transmitter in Colorado Springs at frequencies down to 6 Hertz. Doing so the whole earth moves into the proximity of his transmitter. We probably have to proceed from assumption that the Tesla radiation primarily concerns the proximity, which also is called the radiant range of the transmitting antenna.
For the approach of vortical and closed-loop field structures derivations for the near-field are known[<i>]. Doing so it must be emphasized that the structures don't follow from the field equations according to Maxwell, but the calculations are based on assumed rotation symmetrical structures. The Maxwell theory by no means is capable of such a structure shaping by principle. The calculation provides as an important result[<i>] that in the proximity of the emitting antenna a phase shift exists between the pointers of the E- and the H-field. The antenna current and the H-field coupled with it lag the E-field of the oscillating dipole charges for 90° (fig. 21.8). These charges form a longitudinal standing wave the antenna rod or antenna dipole. For this reason also the fields produced by high-frequency currents at first have the properties of a longitudinal wave in the proximity of the antenna.

The near-field already is used in practice in anti-theft devices, as they are installed in the entrance area of stores. The customer walks through the scalar wave transmitters. If the coupling coil has not been removed at the cash point, then a signal from the alarm system sounds. The coils work purely passive, i.e. they are supplied with electric energy per scalar wave and stimulated 'to oscillate for their part. Then the effect back on the transmitter is being utilized. Even if the principle is functioning, people still should be warned not to use a technology, which has not been understood completely. Then not explained catastrophes are inevitable [<ii>].

<i>: Zinke, Brunswig: Lehrbuch der Hochfrequenztechnik, 1. Bd., 3.Aufl. Springer-Verlag Berlin 1986, Seite 335

<ii>: dpa-message in the Sudkurier of 25.11.2000: ,,Gefahr furs Herz". (quoted at the left, fig. 21.8)

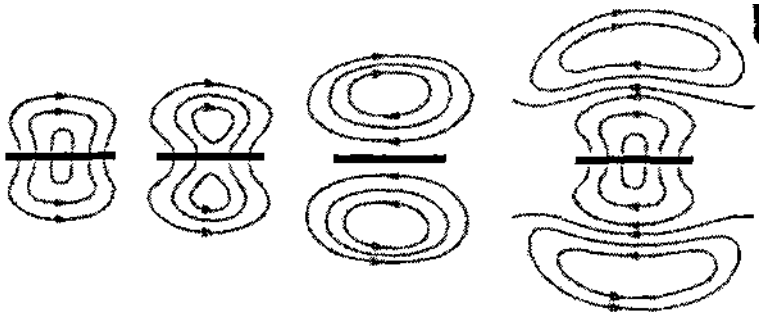


Fig. 21.9 A: The coming off of the electric field lines from a dipole
The forming vortex structures found a longitudinal electric wave carrying impulse!

electromagnetic wave (transverse)

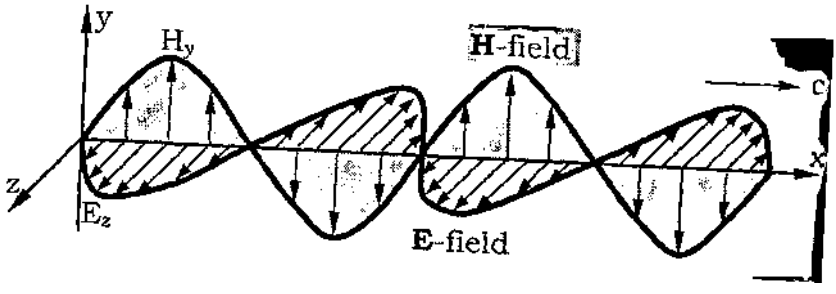


Fig. 21.9 B: The planar electromagnetic wave in the far zone

21.9 Transition to the far-field

In sufficient distance to the transmitting antenna as far-field the transverse electromagnetic wave results (fig. 21.9 B). It is distinguished by not occurring a phase shift between E- and H-field anymore. Every change of the electric alternating field is followed immediately and at the same time by a change of the magnetic alternating field and vice versa.
In the proximity however the phase shift amounts to 90°. Somewhere and somehow between the causing antenna current and the far-field a conversion from a longitudinal into a transverse wave occurs. How should one imagine the transition?

In the books the coming off of a wave from a dipole is represented according to fig. 21.9 A. The fields come off the antenna, the explanation reads. If we consider the structure of the fields coming off then we see field vortices, which run around a point, which we can call the vortex centre. Such field structures naturally are capable of forming standing waves and to carry an impulse. The scalar wave field in general and the near-field in special we only will understand with suitable vortex physics and with a field theory extended for corresponding vortices we also will be able to calculate it. Postulates cannot replace field physics!

Be that as it may, the vortex, after having left the antenna, for bigger getting distance at some time seems to unroll to propagate further as an electromagnetic wave. There takes place a transition from longitudinal to transverse, or spoken figuratively, from vortex to wave. How complete this conversion takes place, how big the respective wave parts are afterwards, on the one hand depends on the structure and the dimensions of the antenna. Information is given by the measurable degree of effectiveness of the antenna.
The vortex structures on the other hand are the stabler, the smaller and faster they are. If they are as fast as the light or even faster, then they become stable elementary particles, for instance neutrinos. Slower vortex structures however are predominantly instable. They preferably unwind to waves. Vortex and wave prove to be two possible and under certain conditions even stable field configurations.

Let's emphasize: A Hertzian dipole doesn't emit Hertzian waves! An antenna as near-field without exception emits vortices, which only at the transition to the far-field unwind to electromagnetic waves. A Hertzian wave just as little can be received with a dipole antenna! At the receiver the conditions are reversed. Here the wave is rolling up to a vortex, which usually is called and conceived as a „standing wave". Only this field vortex causes an antenna current in the rod, which the receiver afterwards amplifies and utilizes.
The mostly unknown or not understood near-field properties prove to be the key to the understanding of the wave equation and of the method of functioning of transmitting and receiving antenna. The question is asked, how one should imagine the rolling up of waves to vortices and vice versa the unrolling? How could an useful vortex mode) look like?

Circularly polarized wave (transverse)

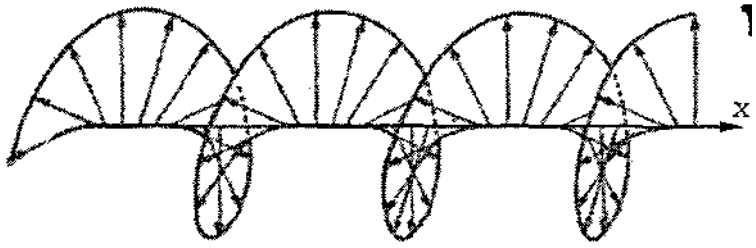


Fig. 21.10 A: Left-circular polarized wave
(as explanation for the transition to a vortex and to a scalar wave)

electric wave (longitudinal)

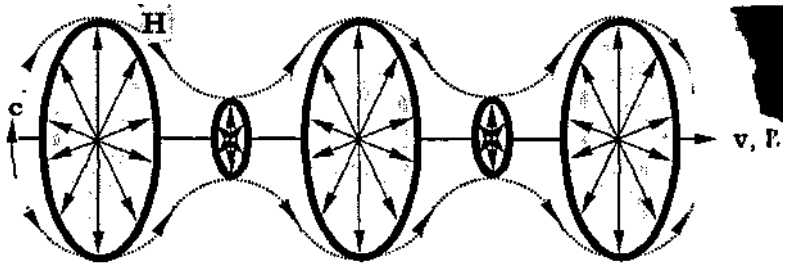


Fig. 21.10 B: Magnetic ring-vortices form an electric scalar wave.

vortex and wave = two stable field configurations
electromagnetic wave = transverse wave propagating in a straight line
ring-like vortex = transverse wave running in circles
vortex velocity = speed of light c
change of structure = if the field is disturbed without expense of energy

22.10 Scalar wave model

The light, as electromagnetic wave, in the presence of a heavy mass or of strong fields is bent towards the field source (fig. 6.10). The wave normally propagating in a straight line thus can be diverted. The square of the speed of light further is inversely proportional to the permeability and dielectricity, short, in presence of matter it is more or less strongly slowed down. If this slowing down of the wave occurs one-sidedly, then a bending of the path can be expected as well. At the end of the antenna a reflection and a going back of the wave can occur, which at the other end again hits itself. Now the wave has found a closed-loop structure, which can be called vortex. The figures 21.10 B and 21.11 A show the two possible structures.

In technical books this vortex with the properties of a „standing wave" is explained gistly. Near-field and standing wave are two examples, how the textbooks succeed in describing mathematically right a small part of the scalar wave properties, without having to have a good look at vortex physics. With such auxiliary descriptions however the end is reached fast, if for instance it concerns understanding a pure scalar wave transmission according to Nikola Tesla (fig. 19.11) and the special properties of this wave type. With the vortex concept of an extended field physics new horizons are opening.

If we direct our look again to the sketches (fig. 21.10 B and 21.11 A). In both cases electromagnetic waves are represented which propagate with the speed of light, only that the wave doesn't go forward in a straight line but instead runs around in circles. It also furthermore is transverse, because the field pointers of the E-field and the H-field oscillate perpendicular to c. By means of the orbit the speed of light c now has become the vortex velocity. Wave and vortex turn out to be two possible and stable field configurations. For the transition from one into the other no energy is used; it only is a question of structure. The vortex structure thus stabilizes itself by means of the field dependency of the speed of light.

By the circumstance that the vortex direction of the ring-like vortex is determined and the field pointers further are standing perpendicular to it, as well as perpendicular to each other, there result two theoretical formation forms for the scalar wave. In the first case (fig 21.10 B) the vector of the H-field points into the direction of the vortex centre and that of the E-field axially to the outside. The vortex however will propagate in this direction in space and appear as a scalar wave, so that the propagation of the wave takes place in the direction of the electric field. I call this an electric wave.

In the second case the field vectors exchange their place. The direction of propagation this time coincides with the oscillating magnetic field pointer (fig. 21.11 A), for which reason I speak of a magnetic wave.

The vortex picture of the rolled up wave already fits very well, because the propagation of a wave direction of its field pointer characterizes a longitudinal wave, because all measurement results are perfectly covered by the vortex model. It even is clear that no energy has to be spended for the conversion, since merely the structure has changed. If it becomes a vortex the wave just doesn't run in a straight line anymore but in circles, to either wrap around the magnetic field vector (fig. 21.10 B). or the electric field vector (fig. 21.11 A).

magnetic wave (longitudinal)

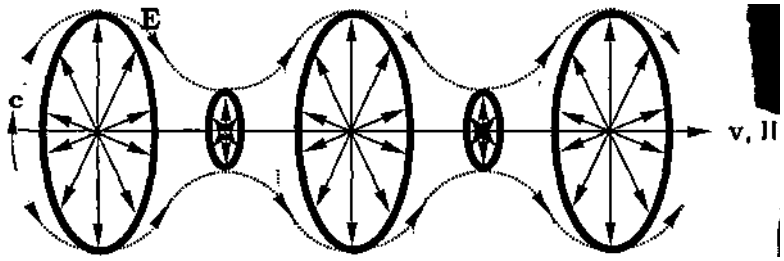


Fig. 21.11 A: The magnetic scalar wave

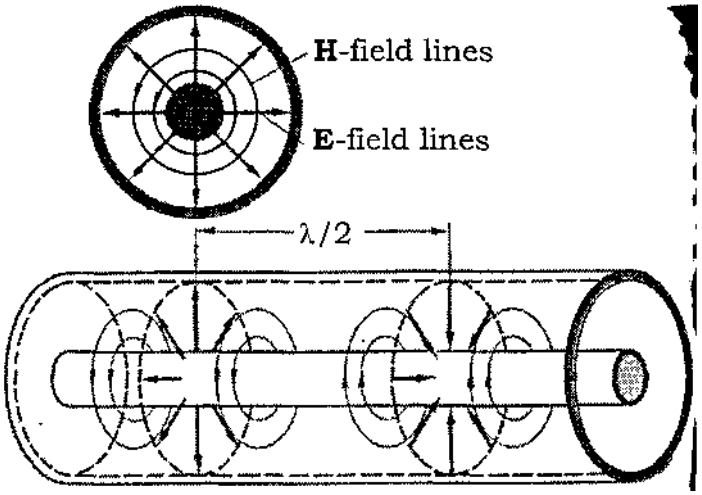


Figure 21.11 B: Wave propagation in a coaxial cable,
(Example for waveguide, horn radiator, etc.)<i>
Cross-section of coaxial conductor and field distribution in the direction of propagation.

<i>: H. Armbruster, G. Grunberger: Elektromagnetische Wellen im Hochfrequenz-

21.11 Double-frequent oscillation of size

Because a longitudinal wave propagates in the direction of the field, the field pointer also will oscillate with the velocity of propagation v. This hence isn't constant at all, it can significantly differ from that of the light and can take arbitrary values. According to the theory of objectivity the field oscillating with it determines its momentary size:

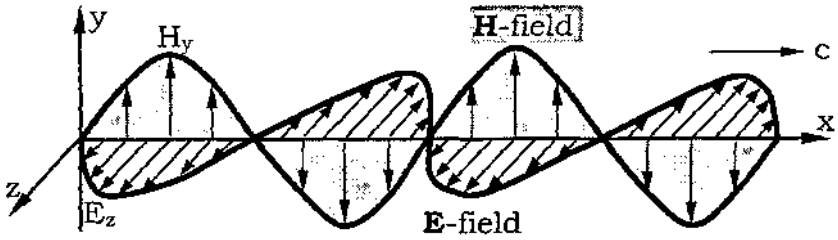
$$E, H \sim 1/v^2 \qquad (21.10).$$

The velocity of propagation v of the scalar wave thus oscillates double-frequently and with opposite phase to the corresponding field. A detailed description would mean, if the field strives for its maximum value, the velocity v of the wave reaches its smallest value. In the field minimum the scalar wave vice versa accelerates to its maximum value. For longitudinal waves therefore only an averaged velocity of propagation is given and measured, as this for instance is usual for the sound wave, and this can vary very strong as is well-known (body sound compared to air sound, etc.).
The two dual field vectors of E and H, the one in the direction of propagation and the one standing perpendicular to it, occur jointly. Both oscillate with the same frequency and both form the ring-like vortex in the respective direction. As a result the ring-like vortex also oscillates in its diameter double-frequently and with opposite phase to the corresponding field (fig. 21.10 Band 21.11 A).
This circumstance owes the ring-like vortex its property, to tunnel. No Faraday cage is able to stop it, as could be demonstrated in experiments<i>. Only therefore the ground wave runs through the earth and not along the curvature of the earth. A further example is the coaxial cable (fig. 21.11 B). Also this acts as a long tunnel and so it isn't further astonishing, that the electric field lines have the same orientation, as for a magnetic scalar wave. As a practical consequence in this place there should be warned of open cable ends, wave guides or horn radiators with regard to uncontrolled emitted scalar waves!

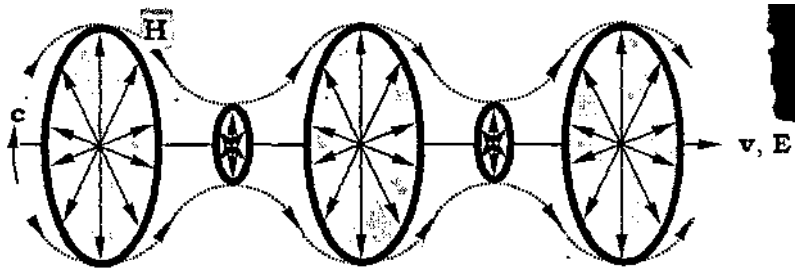
At present in the press is being discussed, if the cable network runners for some channels the mission to operate again should be withdrawn, because the airline radio traffic is being disturbed. The original opening for cable frequencies, which actually are reserved for the airline radio traffic, based on the erroneous assumption, that conflicts are unthinkable. But then the planes were disturbed in their communication. As the cause TV-cables made out, which hadn't been closed according to the rules with a resistor, as it by all means can occur on building sites and during renovation works. On the other hand is being argued with the small current, which flows through the coaxial cable, and the large distance to the planes also is cited. According to that it actually can't concern Hertzian waves. It presumably are scalar waves, which escape from the open cable ends and which are collected by a receiver in the plane. It indeed is very little field energy, but because it again is being collected and bundled, the scalar wave is able to exceed the part of the radio wave by far just at large distances and to cause problems. For such examples from practice the scalar wave theory is fully taking effect.

<i>: Adolf und Inge Schneider im Interview mit Prof. Dr.-Ing. Konstantin Meyl: Durchbruch in der Freien-Energie-Forschung, NET-Journal 12/1999, S. 7-9.

1. H. Hertz: electromagnetic wave (transverse)



2. Nikola Tesla: electric wave (longitudinal)



3. magnetic wave (longitudinal)

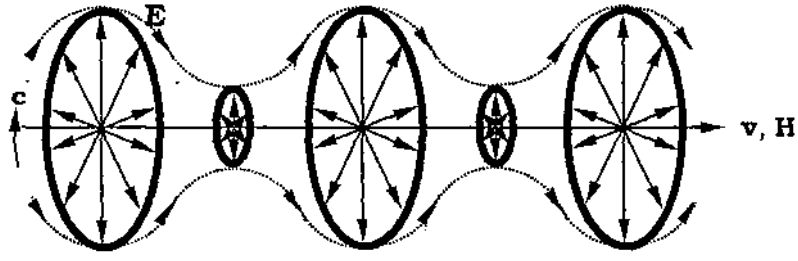


Fig. 21.12: The three basic types according to the wave equation
(21.1), (electric, magnetic and electromagnetic wave).

21.12 Electric and magnetic scalar wave

Let us record: For the wave propagation there thus are three possible and stable states (fig. 21.12): the transverse electromagnetic wave according to Heinrich Hertz (fig. 1), the longitudinal electric wave according to Nikola Tesla (fig. 2), and a longitudinal magnetic wave (fig. 3), which isn't connected yet with a name of a discoverer. The last one is a pure product of my theoretical derivation. The question is asked, which practical meaning the magnetic wave could have.
It is formed by individual electric field vortices, which I have discovered and called potential vortices 1990. I proceed from the assumption that the youngest of the three waves will play the by far biggest role in the future, because its properties are unattainable, both with regard to the energy technical and to the information technical use. One example for each should support this thesis.

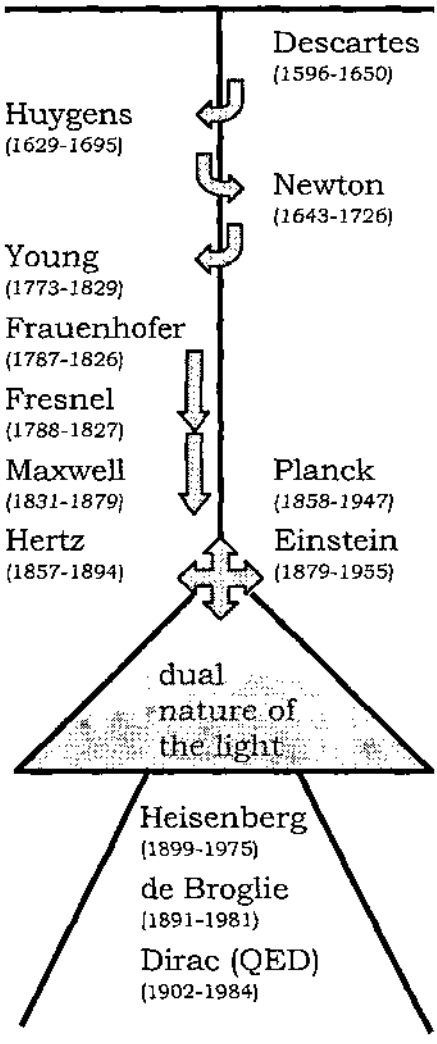
The experiments concerning the electric wave according to Nikola Tesla, where is being worked with electrically charged spheres, don't show a particularly high power. Magnetic converters, so the experiences of my laboratory activities, are superior to an electrostatic converter as a collector for free energy by far. That even can be expected, because a magnetic engine is much smaller than an electrostatic engine of the same power as is well-known.

At a congress of medicines was given a talk on the basic regulation of the cells, on the communication of the cells with each other. Professor Heine in his decades of research work has found out that the cells for the purpose of communication build up channels for instance in the connective tissue, which after having conducted the information again collapse. Interestingly the channels have a hyperboloid structure, for which no conclusive explanation exists.
The structure of the data channels however is identical with the one of a magnetic scalar wave, as shown in fig. 3. Through a channel formed such, which functions like a tunnel or a dissimilarly formed waveguide, only one very particular scalar wave can run through. Waves with different frequencies or wavelengths don't fit through the hyperboloid formed tunnel at all in the first place. Through that the information transmission obtains an extremely high degree of safety for interference.
To the biologist here a completely new view at the function of a cell and the basic regulation of the whole organism is opening. The information tunnel temporarily forms more or less a vacuum, through which only potential vortices can be conducted, and that without any losses - simply perfect! From this example is becoming clear that nature is working with scalar waves namely with magnetic waves.

One other point should be recorded: The mentioned tunnel experiments, in which speed faster than light is being measured with most different devices, impressively confirm the presence of scalar waves. But if scalar waves exist which are faster than light and other ones, which are slower, then it almost is obvious that also such ones will exist, which propagate exactly with the speed of light. These then will have all the properties of the light and won't differ from the corresponding electromagnetic wave in the observable result. As scalar wave it however is formed by vortex configurations, which unambiguously have particle nature. Nothing would be more obvious than to equate these quantum structures with the photons.

Question: Is the light wave or particle?

Seen strictly causal, i.e. physically in the period between 1600 and 1900:



Turning away from classical physics: (removing of the principle of cause and effect)

Fig. 22.1: The view of some physicists concerning the nature of the light as wave or as particle.

According to the wave equation the light is a mixture of wave and photon radiation!

22 Properties of scalar waves

For the light quanta hypothesis the Nobel Prize for physics was awarded 1921. But it only was a hypothesis, an idee fixe, which was honoured here. It is quite odd, if such an important prize is awarded to a research scientist, who hasn't got the slightest idea what light quanta are anyway, of what they consist and how they are built up. Albert Einstein cleverly used the embarrassing situation, by in his celebration speech on the occasion of the awarding of the Nobel Prize giving a talk on the theory of relativity. After the speech a member of the committee found it necessary, to point to it, that this wasn't object of the awarding of the prize and that the theory of relativity concerns a pure theory, which can't be proven by principle. A theory hence neither could be awarded the Nobel Prize.
Such words on the occasion of awarding a prize for a daredevil hypothesis give the whole event really grotesque characteristics. But it came still worse.

22.1 Wave-particle compromise

Physicists of name and rank had come together. It concerned the question if the light is wave, or particle or even both at the same time? For both variants experimental proof was present, the discussion became inflamed and the things boiled over. Finally they were as smart as before, as Werner Heisenberg presented his ideas concerning the uncertainty principle. This compromise, on which one eventually came to an agreement, with good cause may be called the worst in the history of physics. It dictates me, what I shell see and how exact I may look. With it the contradiction should be overcome that the light contrary to every causality should be wave and particle at the same time.

Such fixings not only have a funny, but also a tragic side. Since it were authorities, which have approved the compromise and the whole community of science has confidence in the statements of its authorities, which immediately and unfiltered is entered in all textbooks. At the meeting it simply and solely concerned the wave equation and only that could have supplied the correct and only possible answer: It falls apart into two parts and this explains, why the light one time appears as an electromagnetic wave and the next time as a vortex particle, which is called photon. The conversion can take place at any time spontaneously and without putting on energy, so that depending on the used measuring technique the particle appears as wave or as particle, but of course never as both at the same time!

Looking back one can say that the funny thing about the situation was that all discussed about the wave and its properties known at that time, that all should know the wave equation. An equation as is well-known says more than a thousand words and one look would have sufficed entirely, to answer the controversial question once and for all. It would have saved us a lot.

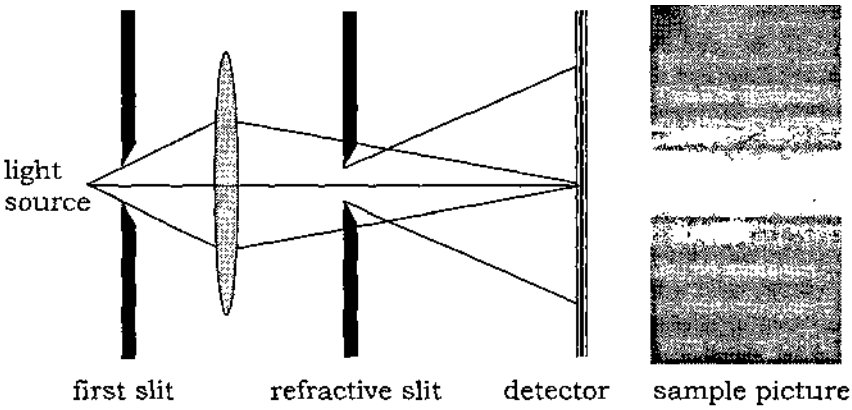


Fig. 22.2 A: Light forms interference patterns at the slit (light stripes are formed, where the waves oscillate in phase, dark stripes, where they oscillate out of phase).

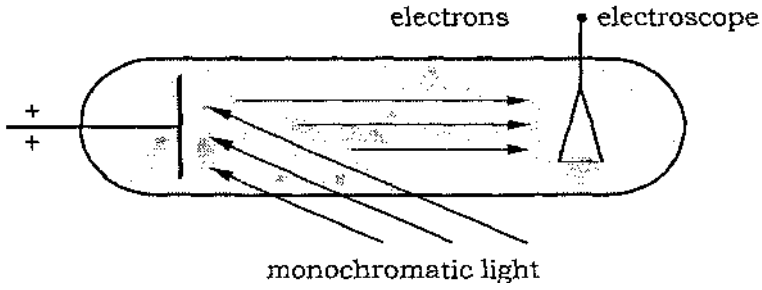


Fig. 22.2 B: The photo-electric effect

<i>: Atome als Energiewellen. Physiker wandelten einen Strom von Natrium atomen in Wellen um. III. Wissenschaft 7/1996, Seite 56 + 57

22.2 Concerning the measurement of light

The uncertainty principle with the interpretation of Heisenberg, the light is wave and particle at the same time, is incompatible with the wave equation. Heisenberg puts an equal sign, where in the wave equation in reality is present an addition of both wave parts. Fortunately in mathematics there is no need of speculating, there a derivation is right or wrong. Nothing is changed to that even if all physicists of the world should go in the wrong direction following the prevailing opinion. The wave equation exert an influence on the interpretation of the light experiments, on the one hand the ones concerning the interference and refraction of the light, where electromagnetic waves are becoming visible (fig. 22.2 A) and on the other hand the photo-electric effect, as proof of light quanta (fig. 22.2 B).

Already the wave theory of Huygens requires interference patterns of light rays, as they for instance are observed behind a slit, and demonstrates with that the wave nature. If on that occasion the particle nature is lost, if thus the photons present before the slit can't be detected behind the slit anymore, then plain and simple the measuring method, thus the slit is to blame for that. The vortices have unrolled themselves at the slit to waves. Corresponding experiments also have been carried out with matter. At the Massachusetts Institute of Technology whole sodium atoms were converted into waves. At the detector pure interference patterns were observed, which go as evidence for the successful dematerialization<1>. But the vortex physicist they show still more: they reveal, that atoms merely are waves rolled up to spherical vortices, which at any time and spontaneously can again unroll to waves at a lattice (chapter 5 and 7).
The common interpretation, the wave nature detectable behind a slit must have been present in the same form already before the slit, is untenable and in the end wrong, as makes clear the experiment with the sodium atoms.

The photo-electric effect, which on the other hand shows the quantum nature of the light, has been discovered by Heinrich Hertz, further investigated by Lenard and finally rendered more precisely by Millikan 1916 (fig. 22.2 B). It bases on the circumstance that light of higher frequency, thus blue light, has more energy than red light of lower frequency. But if electrons are knocked out a metal plate by light, then that occurs, by the waves rolling up to vortices. Now indeed photons are at work, which are detected with an electroscope indirectly.
In the same way a photon ray in a bubble chamber can be photographed. But also here the measuring method is responsible for what is being observed.

A good example is the human eye, the rods and cones of which merely can pick up potential vortices and pass them on to the nerves as so-called reaction potentials. Incident waves can only be detected, if they first have rolled up to vortices in the corpus vitreum of the eye. For us seeing, it doesn't play a role of how many percent vortices and waves the light is consisting.
Behind a sheet of glass for instance a larger vortex part can be expected and still the light has the same brightness as without sheet; the sheet of glass is perceived as transparent. We nevertheless must assume that light with a large wave part has another quality, than such light behind glass or artificial light with a large part of photons.

wave equation:

$$\Delta \mathbf{E} = \text{grad div } \mathbf{E} - \text{rot rot } \mathbf{E} = \frac{1}{c^2} \cdot \frac{\delta^2 \mathbf{E}}{\delta t^2}$$

Nikola Tesla:	*Heinrich Hertz:*
• **scalar wave** (electric or magnetic) =	**electromagnetic wave =**
• **longitudinal wave**	**transverse wave**
form (each time for velocity of propagation v):	form (each time for frequency):
• (v > c): neutrino radiation, morphogenetic fields,...	• cosmic radiation
	• X-rays,
• (v = c): photons,	• UV radiation,
	• light,
• (v < c): plasma wave, thermal vortices, biophotons, earth radiation,...	• infra-red radiation,
	• microwaves,
	• radio waves,
• (v = 0): noise,...	• VLF, ULF,...

Fig. 22.3:____ The two parts of the wave equation

22.3 Comparison of the parts of Tesla and Hertz

Light as a rule always is formed as photon radiation, even on the sun. If in the end only waves arrive on earth, then the vortices sometime on the way to us must have unrolled to waves. Photon radiation after all is a scalar wave radiation, which generally is predominant in the near-field of the source of radiation. There is no reason, why the light should act in another way than the wave radiated by a radio transmitter, which as well forms vortices in the near-field area, as we already have discussed. For different interpretations of wave properties of one and the same physical phenomenon there is no place in a unified theory.

If we stay at the comparison then it is not an individual case that an experimental setup is responsible for what is being measured and observed. A parallel case to the experiments concerning the nature of the light is the one concerning the wave propagation. Hertz has received and utilized the transverse part and Tesla the longitudinal part and either one claimed, only he is right. There doesn' t exist an other equation, which has been and is being ignored and misunderstood so thoroughly, as the wave equation.

Fig. 22.3 shows in a survey the two parts of the wave equation in the assignment to the terms and forms: Right hand side the electromagnetic wave according to Heinrich Hertz and left hand side the scalar wave according to Nikola Tesla. The terms, like on the one hand transverse wave and on the other hand longitudinal wave relate to the kind of wave propagation.

If the field pointers oscillate crossways to the direction of propagation, then as a consequence the velocity of propagation is decoupled from the oscillating fields. The result in all cases is the speed of light, and that in our observation is constant.
It is usual to make a list for increasing frequency, starting at the longest waves (ELF and VLF) over the radio waves (LW, MW, SW, UHF), the TV channels (VHF, UHF), the microwaves, the infra-red radiation, the light, the X-rays up to the cosmic radiation.
It really is interesting that it concerns one and the same phenomenon despite the different forms! As long as Maxwell only had published a theory for the light, in the world of science 24 years long at first nothing at all happened. Only Heinrich Hertz with his short wave experiments opened the eyes. Now all suddenly started at the same time to research into various phenomena on the frequency scale, from Madame Curie over Konrad Rontgen up to Nikola Tesla, who primarily researched the area of long waves.

With regard to the scalar waves until now a corresponding booster detonation has failed to appear. The immense area is new ground scientifically, which is awaiting to be explored systematically. I try to make a contribution with my historic rebuild of a scalar wave transmission line according to the plans of Tesla[<i>].

<i>: Im Gesprach mit dem Fernsehmoderator und Buchautor Johannes von Buttlar weise ich auf die Chancen und technischen Moglichkeiten hin: Johannes von Buttlar im Gesprach mit Prof. Dr. Konstantin Meyl: Neutrinopower, Argo-Verlag Marktoberdorf, 1. Aufl. (2000).

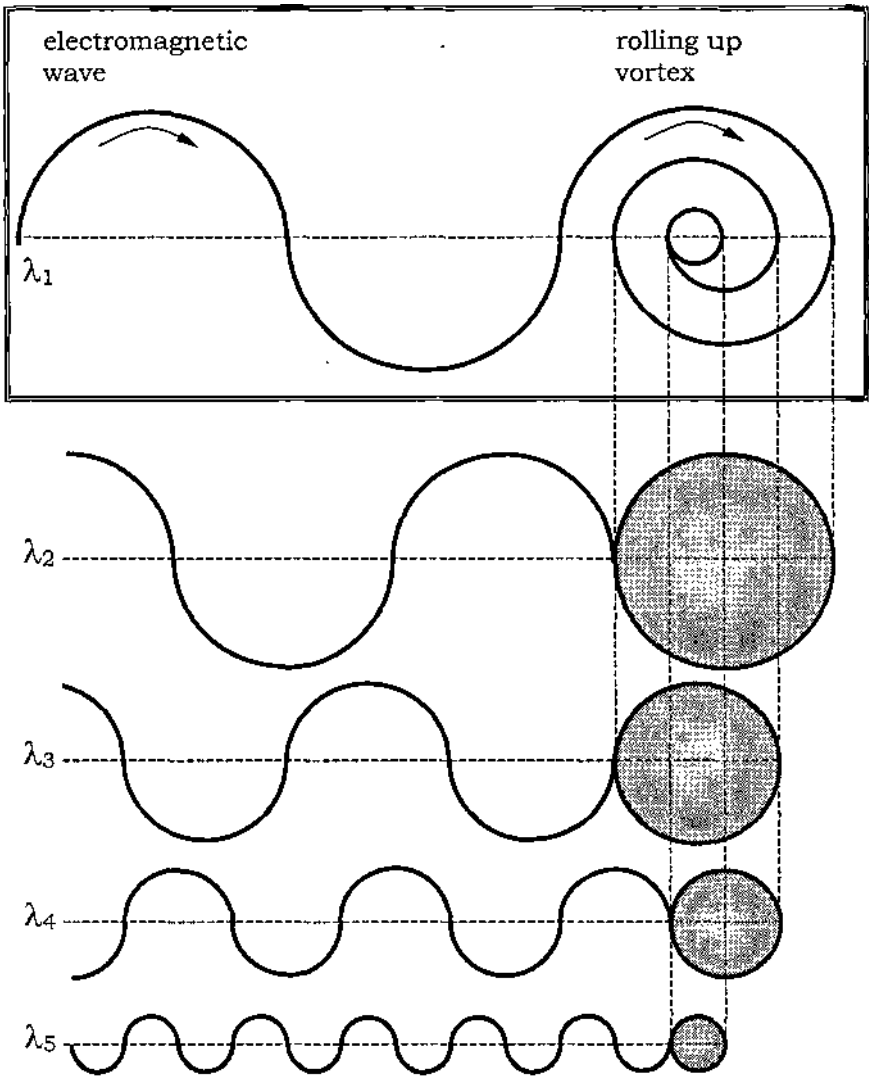


Fig. 22.4: The wave rolling up to a vortex.

wavelength of the wave: $\lambda_1 = c/f_1$
wavelength of the vortex: λ_n (n = 1,2,3,4,5) $\leq \lambda_1$
$f_5 > f_4 > f_3 > f_2 > f_1$ $\lambda_5 < \lambda_4 < \lambda_3 < \lambda_2 < \lambda_1$

22.4 Noise, a scalar wave phenomenon

Longitudinal waves can take arbitrary velocities between zero and infinity, because they propagate in the direction of an oscillating field pointer and as a consequence of that their velocity of propagation oscillates as well and by no means is constant. It does make sense to llist the forms of scalar waves according to their respective velocity of propagation (fig. 22.3, left column).
If we start with a localized vortex, a wave rolling up, which further is contracting. Doing so the wavelength gets smaller and smaller, whereas the frequency increases. An evenly frequency mixture distributed over a broad frequency band is observed. This phenomenon is called noise (fig. 1.4). But besides the localized noise, noise vortices can also be on the way with a certain velocity as a scalar wave, e.g. for the radio noise. In this case they show the typical properties of a standing wave with nodes and antinodes.

Also the earth radiation is said to have standing wave nature, which can be interpreted as slowed down neutrino radiation. If it is slowed down on the way through the earth, then the neutrino properties are changing, as this was measured in the Kamiokande detector in Japan recently. Unfortunately the proof occurs only indirect, because there still don't exist measuring devices for scalar waves. We'll talk about this problem area later and are content with the clue that already within living memory the standing wave property has been used to find water and deposits of ores and still is used today (fig. 22.4).

If we continue our considerations concerning the forms of scalar waves, as they are listed in fig. 22.3. The scalar waves, which are slower on the way than the light, are joined by the plasma waves. This is confirmed by measurements and calculations.
For thermal vortices, as they have been investigated by Max Planck and for biophotons, as they can be detected in living cells by colleague Popp, the velocity of propagation however is unknown. It was not and still is not measured at all, now more than ever. The research scientists have confidence in the assumption that all waves go with the speed of light, but that is a big mistake.
For all wave kinds there at least exists also one vortex variant, for radio waves for instance it is the radio noise, which propagates with a velocity different from c. The velocity is the product of frequency and wavelength:

$$v = f \cdot \lambda \quad (22.1)$$

From the three variables v, f and λ at least two must be measured, if one has a suspicion that it could concern scalar waves. At this place most errors are made in the laboratories. Countless experiments concerning the biological compatibility, concerning medical therapy methods and similar experiments must be repeated, because as a rule only the frequency is being measured and it has been omitted to at least check the wavelength or the velocity of the wave. Countless research scientists must put up with this accusation. Much too blind the scientists, who now again may start from the very beginning with their work, have had confidence in the predominance of the speed of light.

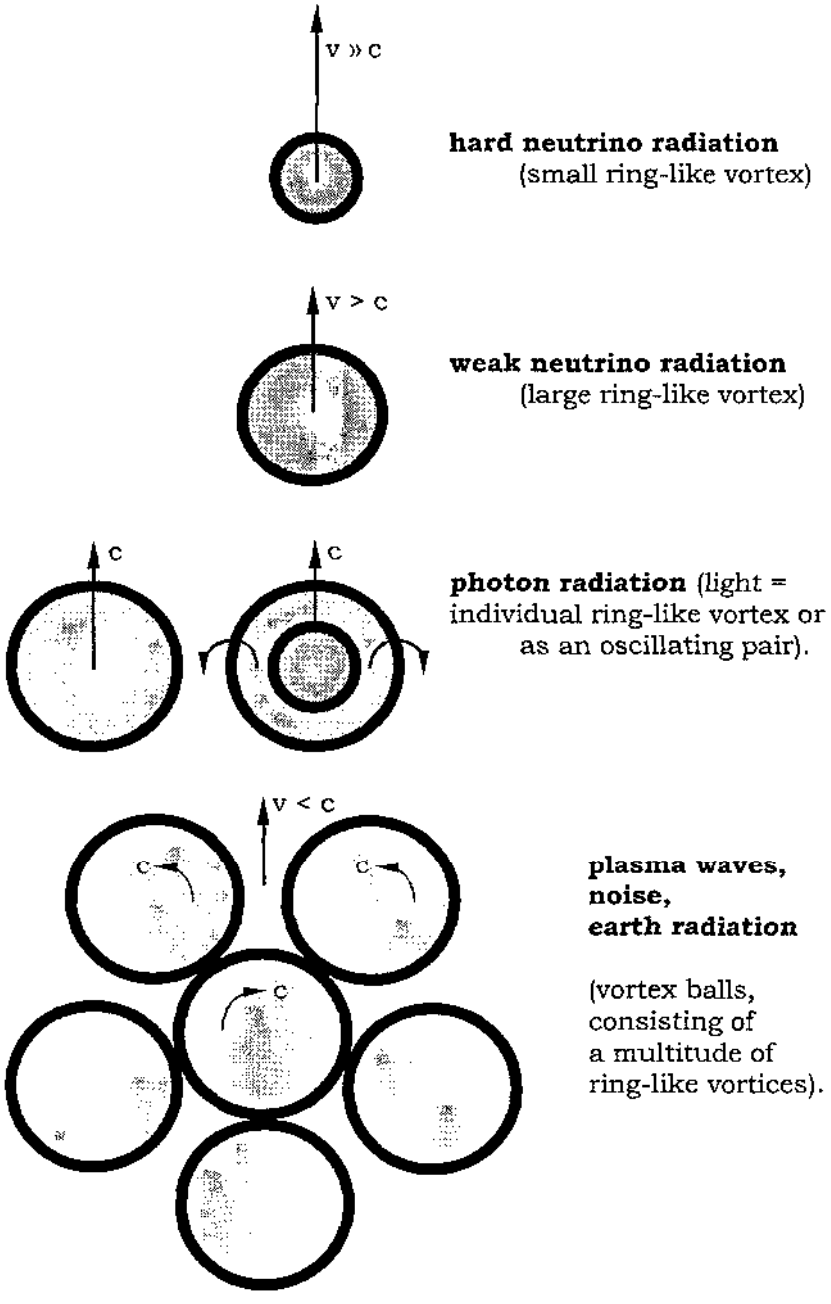


Fig. 22.5: ____ The ring-like vortex model of scalar waves.

22.5 Neutrino radiation

The neutrino physicists make the same error. They proceed from the assumption that their particles are on the way with a speed somewhat less than the speed of light c. This contradicts the observation according to which black holes should represent strong sources of neutrinos, which are black only for the reason that no particle radiation is able to escape them, which is on the way with c or even slower. If a black hole does hurl neutrino radiation into space, than that must be considerably faster than c, as normal neutrino physicists still by no means can imagine it today.
But the neutrino radiation only can be detected after it has been slowed down to a value, which is smaller than c. If the slowing down occurs slightly assymmetrical, then as a consequence a mean of the mass different from zero appears. The „measurement" of such a rest mass, as it at present is propagated and celebrated, is a classical measurement error! As long as a neutrino on the way to us still is faster than the light, the mean of its mass is generally zero. The effective value of the mass of a neutrino is however considerable. Only it is able to give account for the sought-for dark matter, as far as it must exist in the today supposed form anyway.

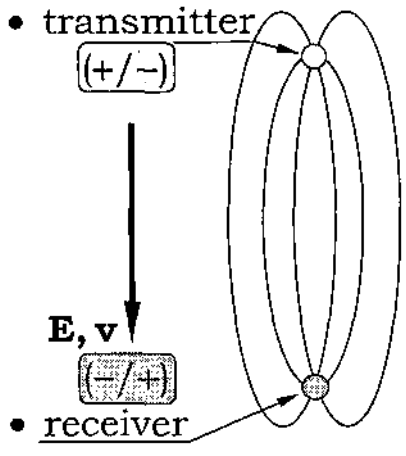
The Tesla radiation, that the discoverer Nikola Tesla already in own experiments had found out, is faster than light (chapter 9.7 and 17.2). Since this Tesla radiation according to the description is identical with the neutrino radiation, since it so to say forms a subset, I will call neutrino radiation all the scalar waves, which are faster than the light. This stretches from the weak radiation at low frequencies up to the hard neutrino radiation of cosmic origin. But the hardness of the radiation does not only increase with the frequency, it in particular increases with the velocity.

The neutrino radiation first of all is carrying energy. On top of this basic wave radiation in addition information can be modulated. Doing so extremely complex modulation variants are offering. Of this kind we must imagine thoughts, as being complex modulated vortices, which can propagate as scalar wave in space. Rupert Sheldrake calls this vortex field a morphogenetic field. At this place merely is pointed at his very interesting research results<i>.
Thoughts can be standing in space, in the form of localized noise, but they also can move with speeds faster than light. According to that a communication with intelligent beings from other star systems by all means wouldn't be an Utopia anymore.

Every fast neutrino forms an individual ring-like vortex (fig. 7.12). The slower the scalar wave is, the more dependent the vortices become. The photon already can consist of two ring-like vortices (fig. 4.6), whereas plasma waves and other slow scalar waves can form from a multitude of individual vortices, which are rotating around each other, to form vortex balls and vortex streets (chapter 4.9 - 4.11). From this circumstance already results very different scalar wave behaviour in the different areas of the velocity of propagation. This trend for small velocities can as well be observed towards lower frequencies. For a certain wavelength the frequency after all (according to eq. 22.1) is proportional to the velocity of propagation.

<i>: R. Sheldrake: Seven experiments that could change the world. New York: Riverhead 1995

scalar wave = energy wave: = *Tesla radiation*	• **electromag-netic wave** = *Hertzian wave*
• can be modulated in a complex way	• can only be modulated linearly
• fast, parallel image transmission	• slow, serial image transmission
• focussing, transmission without losses	• scattering, transmission losses
• positive use: mobile, directional radio, energy converter	• positive use: radio, TV, information distributor
• negative use electro smog, radiation weapons	• negative use: mobile, directional radio



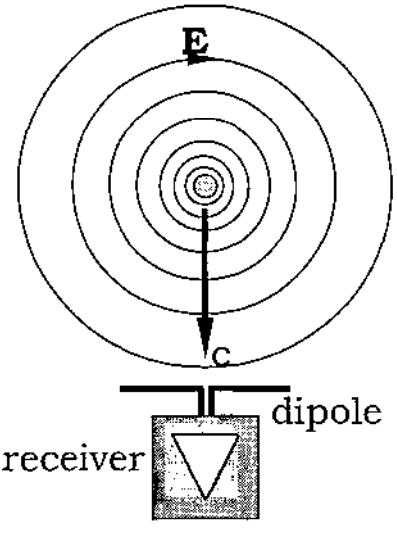


Fig. 22.6: Scalar waves and radio waves, comparison of the properties.

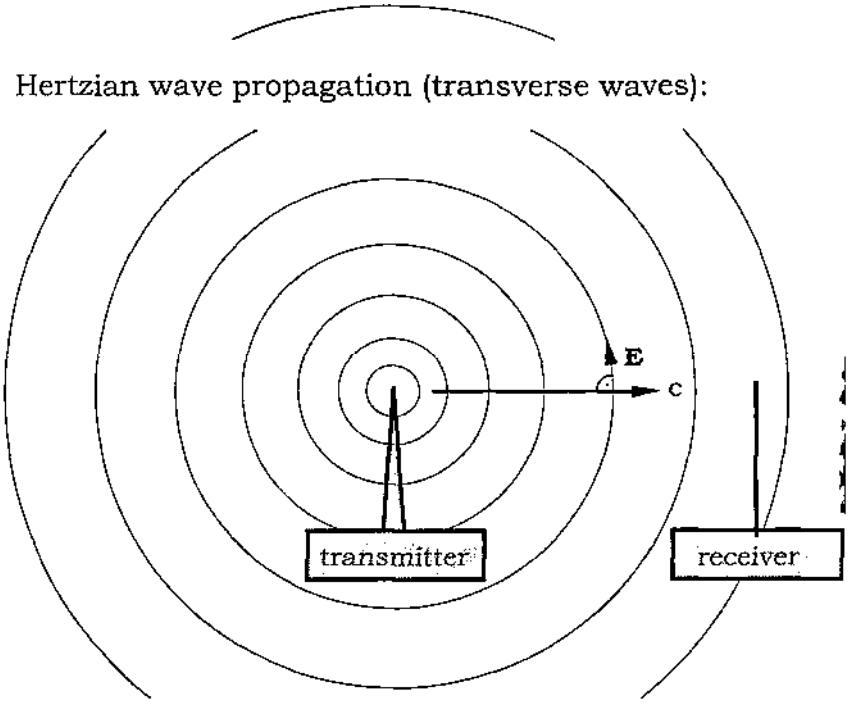
22.6 Parallel instead of serial image transmission

We continue with our considerations concerning the special properties of scalar waves, represented in the left column, and compare these with the well-known behaviour of electromagnetic waves in the right column (fig. 22.3 is now followed by fig. 22.6). If we again take up the possibilities for modulation and the transmission of information, then it becomes very clear from the comparison that we today work with a technology, which we it is true master more or less, but which is everything else but optimum.
For the Hertzian wave the velocity of propagation is constant. With the frequency therefore at the same time also the wavelength is being modulated. But that strongly limits the information transmission. An image for instance must be transmitted serially point after point and line after line. The serial image transmission takes place very slowly, for which reason the velocity of the PCs permanently must be increased, so that the amount of data can be managed.
With the clock frequency on the other hand also the losses increase, so that in the end the CPU-cooler limits the efficiency of modern PCs. Something our engineers obviously do wrong, as a comparison with the human brain clarifies. Our brain works without a fan. For it a clock frequency of 10 Hertz is sufficient. It needs neither Megahertz nor Gigahertz Irequencies and despite that is considerably more efficient.

Nature only works with the best technology. The second best technology, as it is put to use in our machines, in the evolution wouldn't have had the slightest chance of surviving. The strategies to optimize of nature are merciless. In a free economy that goes completely different. There the „bunglers" are joining together to companies dominating the market, buying up the innovative ideas without further ado, to let them disappear in the drawer, so that they can bungle further in the way they did until now. It after all have been the lousy products, which have made them to the companies they are today. The ego of power is incompatible with the interests of nature.

Nature works with scalar waves and their velocity of propagation is arbitrary. Wavelength and frequency now can be modulated and information can be recorded separately. In this manner a whole dimension is gained to modulate, the image transmission can take place in parallel, which means considerably faster, safer and more reliable. As anyone of us knows by own experience, assembling the image takes place all at once, the memory of past images takes place ad hoc. Nature is indescribable more efficient than technology with the scalar wave technique.

If we again take the right-hand side of fig. 22.6 with the properties of the Hertzian wave. In the opinion of Nikola Tesla it is a gigantic waste of energy. The broadcasting power is scattered in all directions and the transmission losses are enormous. At the receiver virtually no power arrives anymore. To receive a radio signal the antenna power has to be amplified immensely. It is a wave, which actually only can be used as radio wave, thus as a wave with which arbitrary many participants should be reached.
This wave however is completely useless, if it concerns a point-to-point connection. If I want to call someone, to talk only with him, a radio wave is the entirely wrong method, because I with that bother hunderds and thousands of people that I don't want to call at all!



Tesla radiation (radiations) = scalar wave, longitudinal wave propagation:

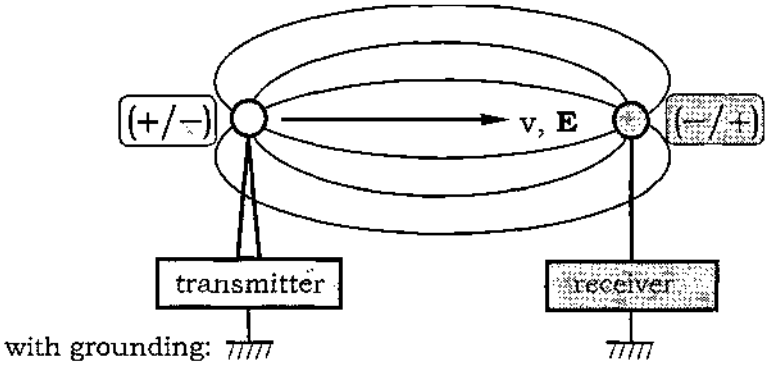


Fig. 22.7: ____Comparison of radio waves according to H. Hertz and electric scalar waves according to Nikola Tesla.

22.7 Comparison of the properties

The course of the field lines clarifies the difference. For the scalar wave all field lines going away from the transmitter run together again. As long as no scattering field occurs, there also won't be any transmission losses. It is an energy wave, for which the full broadcasting power is transmitted wirelessly and which arrives at the receiver, by that focussing the field lines again.

Here one at once numerous technical applications come to mind, if energy should be transmitted wirelessly. A TV, which supplies its remote control with energy itself, lelemetric installations, which are fixed at difficult accessible or rotating machine parts and which can't work without energy supply.

For a mobile with 3 Watts of broadcasting power only a few microwatt arrive at the ground station. If I would have a scalar wave mobile, which functions with resonance, then a broadcasting power of some microwatt will be completely sufficient, to carry out a telephone call right through the earth. This minimum broadcasting power suffices, because everything, what is being transmitted, arrives at the receiver - crucial is that the conditions of resonance are fulfilled. That means, both must have the same frequency and the opposite phase. In addition the modulation has to fit, so that on the one hand not several participants in the conversation are getting in each other's way. For a purely carrier wave transmission on the other hand there would be the risk of natural fields being collected also and the power at the receiver taking inadmissibly high values. This is prevented effectively by a correspondingly complex modulation. Nature solves the problem in exactly this manner.
Mobile phone technology with scalar waves of course still is a pie in the sky. A big challenge for the engineers poses the adjustment condition of opposite phase and the fitting modulation, which Tesla called „individualisation"[<i>]. Entirely by the way the network runners and the telephone companies are getting quite superfluous.

Telephone charges, so one perhaps can read in the history books in a hunderd years, were the indication of a century of rigorous exploitation of man and nature. With scalar waves a direct, more dimensionally modulated information transmission directly with the partner of conversation is possible and sufficient energy is available to humanity any time and any place, without being dependent on any companies! This notion is not new, but it is inconvenient for the rules; already Nikola Tesla has written about it, but obviously no-one wanted to listen to him[<ii>].

Scalar waves are able, that is made clear by the properties, to revolutionize both the energy technology and the information technology fundamentally. It is more than only a technology for the new century. Scalar waves are a chance for the whole millennium!

<i>: N. Tesla: Transmission of electrical energy without wires, Electrical World and Engineer 7.1.1905; Edition Tesla Vol. 4, P. 131.

<ii>: N. Tesla, New York Times of 15.9.1908; Edition Tesla Vol. 6, P. 241.

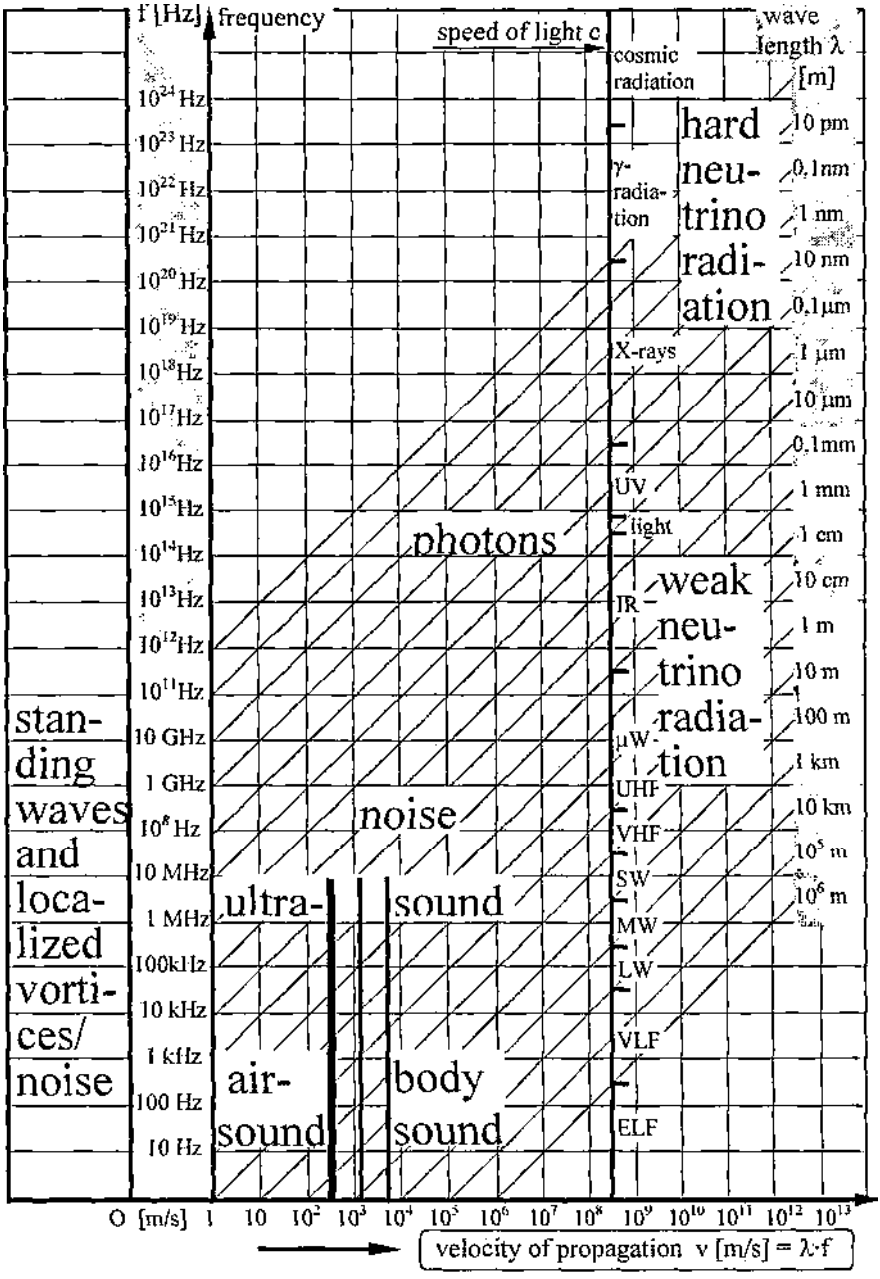


Fig. 23.1: Frequency diagram of longitudinal and transverse
waves as they depend on the velocity v.

23. Research of scalar waves

Scalar waves are still unexplored area, scientific new ground as it were. Individual research scientists already have selectively ventured forward in this area and have described properties of the scalar wave investigated by them in their special research area mostly in measurement technical manner. But as a rule they lack the physical relation, as it is derived in this book for the first time. If we don't proceed from individual measurements, but from the wave equation and the mathematical physical derivation of scalar waves, then we have the great chance to understand as something belonging together on the one hand noise, photons, neutrinos and lots of other known phenomena as well as on the other hand still unknown phenomena, which are called parascientific. We should remember that we without theory of Maxwell and the representation in a frequency band today still wouldn't know that the radio waves (LW, MW, KW, UHF), the microwaves (μW), the infrared thermal radiation (IR), the light and the X-rays concern just the same phenomenon. The graphic representation of both waves in one diagram in this place is extremely helpful.

23.1 Frequency diagram

In fig. 23.1 the frequency f is shown against the velocity of propagation v with the wavelength λ as parameter. The broad line at $3*10^8$ m/s represents the speed of light c. Here the frequency band of the transverse waves can be found again in the well-known one-dimensional representation.
Crosswise to that, somewhat unusual, the longitudinal waves run. These start at the left at localized noise, over the sound as it propagates in air, in water and in metal, over a large, to a large extent still unexplored, range of the bio photons, the heat vortices and of the dowsing rod effects and end on the other side of the speed of light at the neutrinos. Between that the special case is settled that the particles, or said better vortices, propagating as a scalar wave have exactly the speed of light. It gives reasons for the circumstance, as already mentioned, that light can appear as wave or as photon radiation. It. according to the wave equation, after all always consists of a combination of both forms. At very high frequencies, e.g. the cosmic radiation, this combination is shifted in the direction of vortices and their distribution as a scalar wave, at low frequencies the tendency inversely goes in the direction of the normal wave.

If we assume that for the transverse wave over all frequencies a dozen of specialized gauges is necessary, each of them also can be switched over in range several times, then we can project that to record a scalar wave of a certain frequency over all velocities of propagation likewise 12 devices and for the whole field shown in fig. 23.1 approximately 12x12 = 144 devices will be necessary. Of these 144 gauges today just 12 are available. There thus still are missing 132 pieces, which should be developed.
With these gauges, so I am convinced, the many white spots in the diagram can be tapped scientifically little by little if a systematic procedure is used. My vortex theory thus will be attached a central importance.

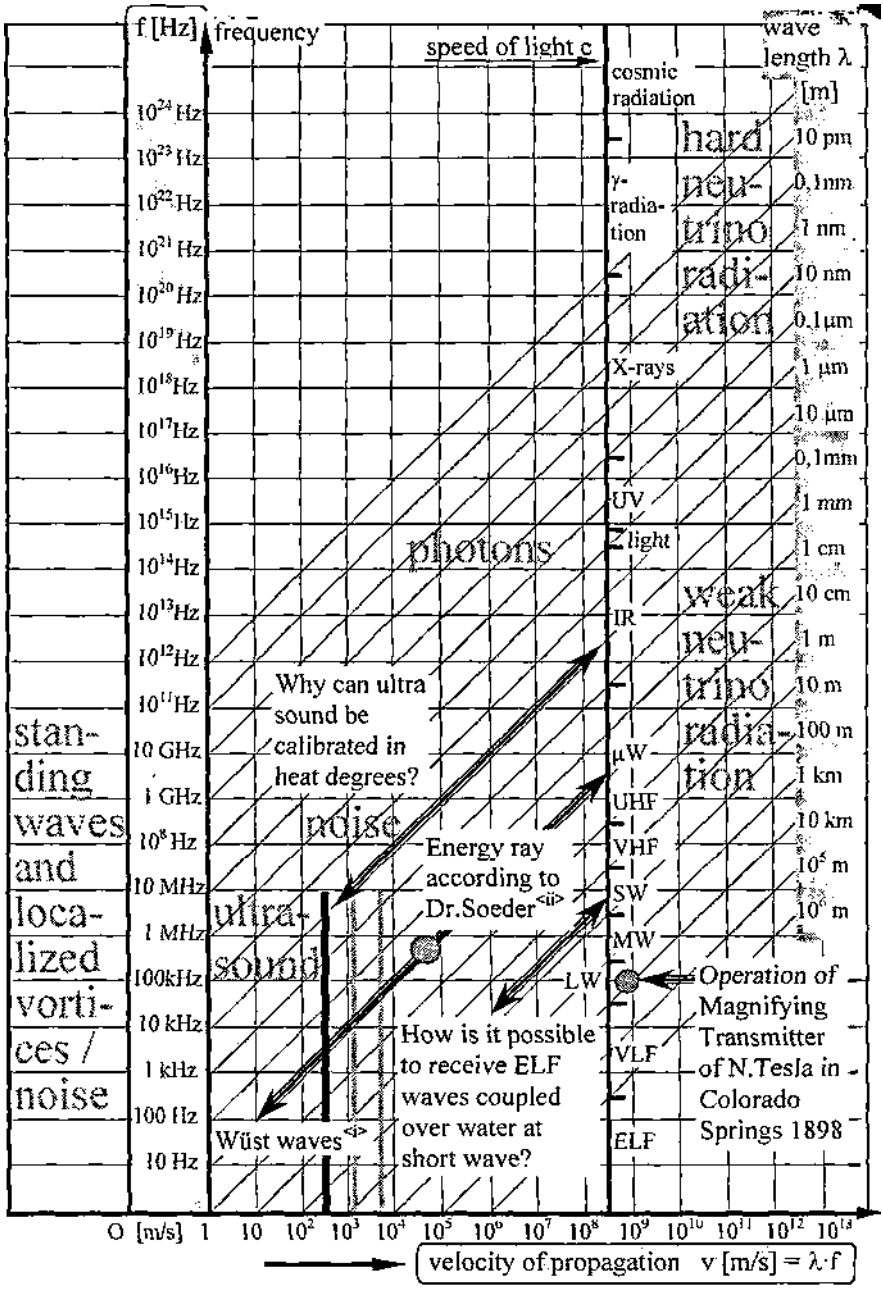


Fig.23.2: Frequency diagram with entries concerning Wust waves,
Tesla transmitter and various not understood effects.

23.2 The reverse of the HF medal

The diagram possibly may settle disputes, like the ones between the „Wustlingen" (note of the translator: the author here is playing with words, Wustlingen literally means lechers) and the „high-frequency engineers".
Professor Wust of Munich already 1934 had proven, that the Wust waves named after him in air have a velocity of propagation of approximately 10 m/s[<i>]. He investigated them in the frequency range between 16 Hz (λ= 60 cm) and 500 Hz (λ= 2 cm). The high-frequency technicians immediately have converted to the speed of light, since they don't know anything else, and on the spot have shifted the phenomenon into the range of the microwaves between 0.5 GHz (λ=60 cm) and 15 GHz (λ= 2 cm). In the diagram now can be found, at which place this phenomenon belongs actually. It presumably concerns the same „energy ray", which Dr. Soeder has observed and proven already at velocities of propagation of 55.2 km/s and wavelengths around 10 cm[<ii>].

Furthermore follows from the diagram (23.2), why ultra sound can be calibrated in heat degrees, and why radio reception of signals from a completely other frequency range is possible by principle, if for identical wavelength a velocity of propagation different from c occurs. Further the range of operation used by Tesla at approx. 1.6 times the speed of light is depicted.

Also the noise is such a book with seven seals. It concerns, it is true, a fixed chapter of high-frequency engineering, but without visible connection to the other chapters. That might be based on the circumstance that the relation, as it is dictated by the wave equation, isn't recognized.
Every high-frequency signal is accompanied by a noise signal; every antenna produces more or less noise. HF engineering dictates the measures, how the noise can be suppressed resp. the signal-noise distance be increased. The goal is to make the electromagnetic wave stand out in such a way from the noise that it can be received. For that the measurement setup must be choosen correspondingly, are the measurement cables dictated, and must be paid attention to power adaptation and corresponding termination resistors. For measuring HF correctly all interference influences should more or less disappear.

But what are the interference influences, which the HF-technician suppresses? According to the wave equation it are the scalar wave parts, and to that also is counted the noise. Every HF-technician thus knows the scalar parts as interfering noise signal, but doing so he completely fails to notice the technical advantages and chances, which e.g. are present in the noise.
If by means of an autocorrelation function a noise signal is compared to itself then often a hidden message comes to light. According to that, informations can be hidden in the noise and of course transmitted wirelessly. This important circumstance is known, but it is hardly used. The noise vortices thus can be modulated in an extremely complex way. There can be transmitted a lot more information in the noise as scalar wave, than with the radio wave.

<i>: J. Wust: Physikalische und chemische Untersuchungen mit einem Rutenganger als Indikator. Further references in W-B-M 3/ 1991, S. 57.

ii>: A. Soeder: Ohne Strom lauft neuer Energiestrahl rund urn den Erdball. Raum & Zeit 59/92 Seite 62-67.

Fig. 23.3: ___ Dowsers dowse an ore vein.[<i>]
From: Speculum metallurgiae politissimum, Rossler, Dresden 1700.

<i>: Ludeling, Hartmut: Handbuch der Radiaesthesie, Verlag Eike Hensch 1994, S. 145, ISBN 3-927407-09-7.

The possibility of more dimensionally modulating and parallel image transmission make scalar waves superior to the radio waves in such a way that one should seriously think about the reversed procedure, in which the noise is conceived as useful signal and the radio wave as interference signal.

In the frequency diagram (23.1 and 23.2) can be read like in a diary, in which most pages it is true still are empty, but in which some very informative marginal notes can be found for different points of difficulty. It mostly are parascientific phenomena, which, not understood and excluded by textbook physics, are waiting to be taken up in the building of physics. As an example we'll pick out an extensive area of alternative research.

23.3 Radiesthesia

A particularly broad spectrum of scalar waves is provided by the already several times mentioned earth radiation. An ancient science of experience, which troubles the exploration of the earth radiation, is the geomancy. The Roman land surveyors, the Augures, used as an aid a flat coil like also Tesla did to receive scalar waves. The Lituus, as the device was called, resembles so much that of the Etrusks that we must proceed from the assumption that the method is much older (fig. 16.10).
This part of the scalar wave research, also called radiesthesia, is derived of ,,radiare", which can be translated with "send out rays" resp. ,,perceive". It describes the doctrine of the sensitivity to radiation of man. Doing so the radiation sensitive uses his own nerve framework as a biosensor.

The nerve conduction could be derived as a biological variant of the Tesla one wire transmission, for which ring-like potential vortices are passed on as action potentials in form of standing waves (fig. 9.6). Of this kind are also the control commands, which cause a muscle to contract. If now corresponding vortices are picked up by means of a dowsing rod or similar aids in our nerves, then the contract addressed muscles contract, because they can't distinguish, from where the command comes. This unconscious nerve twitch leads to a swing of the dowsing rod and to the well-known dowsing rod phenomenon. But man can't replace a technical gauge. Hence one speaks of dowsing and not of measuring. To this should be added the condition of resonance, which must be fulfilled. Since every person however builds up other resonances, dowsed results of others often can't be reproduced. But from this particular difficulty one cannot draw the conclusion that the phenomenon does not exist and radiesthesia is not a science. Series surveys and statistical analyses here in any case don't lead any further. It always only are individual talented dowsers, who have at their disposal really fantastic abilities and find with great certainty water, ores and even oil.
With the perception of a physical phenomenon it mostly starts. Cultural man looks after his discovery as cult, whereas modern man, guided by the wish for reproducibility and more objectivity, is troubled to design and to build a technical measurement work. With regard to the scalar wave in general and the radiesthesia in special we still are at the stage of the Stone Age.

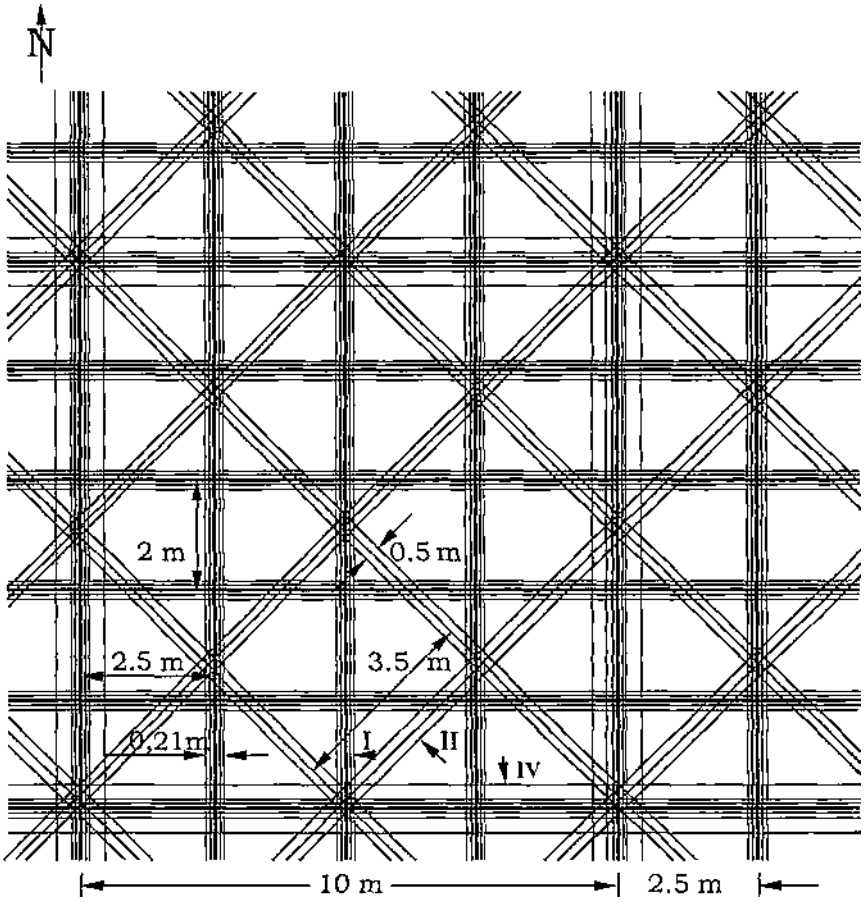


Fig. 23.4: Nets dowsed at latitude 49.<i>

I. net: ,,global net" according to Dr. E. Hartmann;
orientation: N - S: 2 m distance and E - W: 2.5 m distance

II. net: ,,diagonal net" according to Dr. M. Curry;
orientation: NE - SW and NW - SE: 3.54 m = 2.5 m * sqrt(2)

[III. ,,lightning net" according to R. Schneider; orientation like I.]

[IV. net acc. to Benker; like I. but: N - S: 10 m and E - W: 10 m]

[V. sun/planet net acc. to W. Auer; with 3.66 m orientation S./P.]

____ According to Prof. E.G.Hensch et al.:
<i>: Hensch: Radiaesthesie im landlichen Bauen und Siedeln, Arbeitskreis zuf Landentwicklung in Hessen, W4, Wiesbaden 1987; resp.: W. Auer: Erdstrahlen?... AWGEO 199, Eigenverlag 1998; resp.: Mayer/Winklbaur: Biostrahlen, 5. Aufl. ORAC Verlag, Wien 1989, Seite 168

23.4 Prediction of earthquakes with the help of scalar waves

The standing wave character of the earth radiation is a help. There are dowsed points and lines of maximum radiation intensity, which form nets, which encompass the whole world. On the one hand we are dealing with a net oriented in direction north-south and east-west (Hartmann net) and on the other hand with a net standing diagonally to that under 45° (Curry net). Because the angle of 45° can be derived as borderline angle from a vortex field calculation[<ii>], I already early have pointed to the circumstance that it here presumably concerns a vortex phenomenon[<iii>].
Because the nets in addition are dowsed in air, it must be vortices of the electric field, so-called potential vortices[<iii>], which here form regular structures. The formation of vortex lines and complete vortex streets (chapter 4.9), which consist of countless individual vortices, can be explained as follows:
Electric scalar waves propagate in the direction of the electric field strength and mediate field vortices, e.g. neutrinos. If at a certain moment the transmitter carries a positive and the receiver a negative charge, then all the particles which are positively charged are repelled by the transmitter and attracted by the receiver. All run at the same time towards the same goal, although all mediated particles carry the same charge and repel each other! This incompatibility can be compensated partly, by the vortices rotating around each other. In this circumstance can be seen the reason for the structure shaping, the formation of some lines in the countryside (fig. 23.3). The distances between the lines have characteristic values, which allow conclusions about the wavelength of the standing waves. We must assume that they dictate the structure shaping and that the spatial vortex distribution aligns with the nodes and antinodes of the respective standing wave. The distance between the lines, which corresponds to half the wavelength, becomes smaller and smaller towards the North Pole and the South Pole of the earth, the net thus narrower and narrower. Also is the net said to change strongly before an earthquake. This all are clues for the circumstance that the structure shaping radiation comes from the earth, that the cause must be sought in the earth radiation.
It should be noted marginally that with scalar wave detectors, which permanently scan the nets, a just as effective as inexpensive earthquake prediction should be possible. Such a facility would be an enormous relief and help for all earthquake warning services. It even should be possible to determine in advance the future epicentre, if there is measured at the same time at if possible many stations and the respective deviations are compared.

A further influential factor is the composition of the subsoil; e.g. ores and metals influence the earth radiation. Water shows a special affinity for the earth radiation. It does collect the radiation and after bundling it up releases it again. To blame is the high dielectricity of water ($\varepsilon \cong 80$), which again favours the formation of potential vortices .
A technical use of this effect would be the neutrinolyse (see fig. 17.6-17.8 and 18.1), the splitting of water molecules by neutrinos if these take the state of an electron, hydrogen escapes and the oxygen content in the water increases. If a neutrino however shows as a positron, then it annihilates and there is formed a light flash, which serves the ,,experts" in neutrino detectors as proof.

<ii>: Meyl, K.: Wirbelstrome, Dissertation Universitat Stuttgart 1984
<iii>: Meyl, K.: Potentialwirbel Band 1, INDEL Verlagsabt. 1990

Spectroid of the radiation field of a subterranean flowing water veign (according to P. Schweizer)[<i>]:

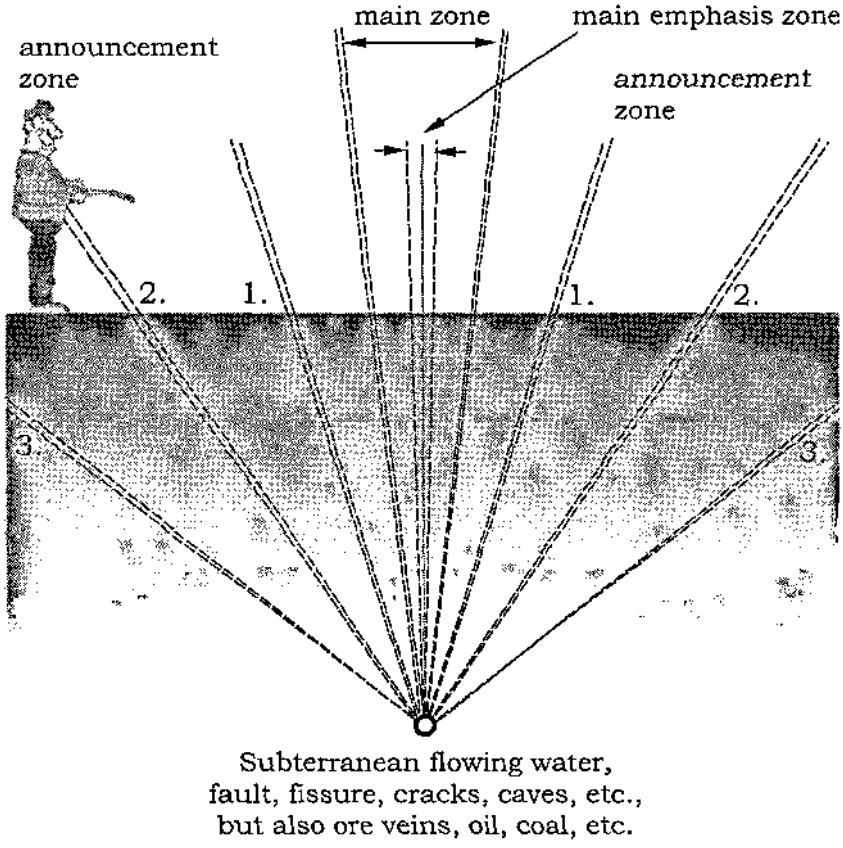


Fig. 23.5:____ Radiaesthetic search for water[<i>], (dowsing of the earth radiation)

<i>: Ludeling, Hartmut: Handbuch der Radiaesthesie, Verlag Eike Hensch 1994 S. 145, ISBN 3-927407-09-7.

23.5 Searching water with the help of scalar waves

Faults of earth's crust lead to fissures and cracks in the rock, which often fill up with standing or flowing water. Potential vortices of the earth radiation are attracted by the high dielectricity of water and are radiated again in slowed down and focussed form. On the surface of the earth the mixture of various scalar waves arriving there can be dowsed as main emphasis zone. For reason of the broad radiation spectrum the results of proficient dowsers in the main emphasis zone more often coincide.
At both sides in addition spectroids are forming, which are dowsed as parallel running vortex lines. Because every harmonic wave produces other lines and every dowser reacts to other resonances, a profound ability is required, if from the distance of the so-called announcement zones the water depth should be inferred (fig. 23.5). Some specialists indicate besides the place and the depth also the amount of deposit and if need be the water quality. For that they analyse the radiation intensity, but unfortunately many all too often overrate their abilities.

Already the Augures, the land surveyors in the age of the Romans have aligned their streets and the castles with the nets and the lines in the countryside. Even today new evidence about the central importance of the standing wave character of scalar waves can be found at excavations (fig. 16.10). Since every scalar wave also occurs coupled with a radio wave by means of the wave equation, earth rays originally could be detected conventionally with field strength gauges. But the intensive use by radio stations has made it necessary to change from the short wave range to the VHF-range and further to the UHF-range. It were indirect measurements, which could be interfered easily. Today geologists work with ELF scanners in a range between 15 and 30 KHz if they search for water. They analyse the emitted signals of submarine transmitters, because these are attracted and amplified by water carrying layers.
Experiments also are carried out with noise receivers or unused broadband TV channels. Others analyse influences of the earth radiation on the magnetic field of the earth, but for this method the expressiveness is controversial.
Again others walk along a path with a scintillation counter measuring the inverse profile. At the places of maximum earth radiation a minimum of gamma radiation is measured. This stunning relation only can be interpreted as follows: the natural radioactive decay at these places takes place accelerated and that proves:
1.. that earth radiation sets radioactivity free and causes it in the first place (chap. 17.1 pp).
2. that in the case of earth radiation it actually concerns slowed down neutrino radiation.
But also this method works indirectly. It only functions in the open air and then only in the case of unspoiled nature, which sometime was covered with an even layer of radioactive dust. By cultivation or plantation the ,,radioactive layer" very often is changed and mixed up, whereupon the measurable profile hardly allows conclusions.
For indirect measurement methods of that kind, for which the measurement variable stands in a relation, which isn't known in more detail, to the scalar wave of interest, generally caaution is advisable. Too often a message is seen in a wonderful 3-D diagram of the magnetic field strength or the radioactivity distribution, which has much more mundane causes.

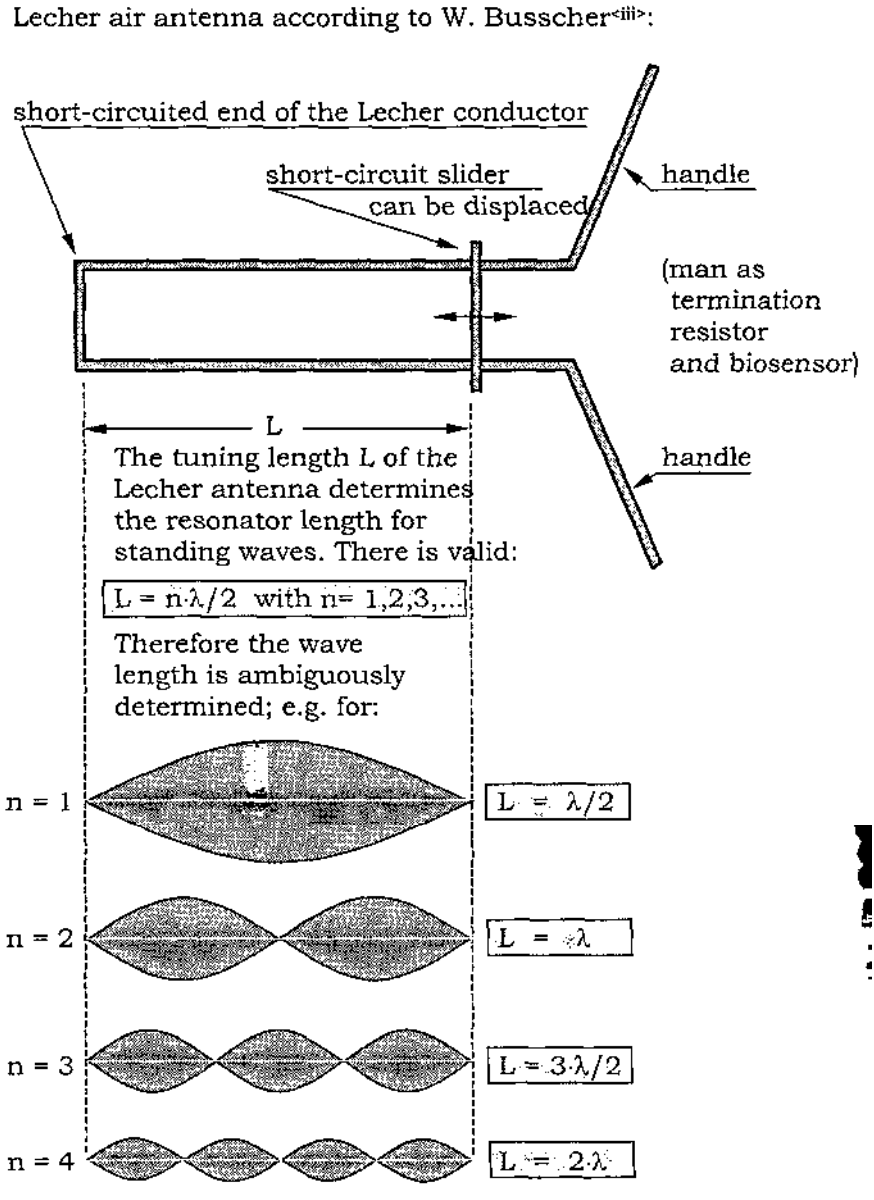


Fig. 23.6: Lecher conductor as scalar wave antenna.

Can be read at Prof. Dr. Ing. Christof Rohrbach:

<iii>: Rohrbach: Radiasthesie, Physikalische Grundlagen und Anwendung in Geobiologie und Medizin, Haug Verlag Heidelberg 1996, Seite 100.

23.6 Receiving scalar waves with the Lecher antenna

In the case of technical gauges it is normal to change the frequency tuning. For that the capacity of a capacitor is being varied, which is part of a resonant circuit. This method can simply be realized with the today available construction elements. Biological systems on the other hand, for instance a person, work primarily with a variation of the wavelength. In this case (according to eq. 22.1) the frequency is directly proportional to the velocity of propagation.
So provide for instance radiaesthetic dowsings clues for the wavelength. The frequency however can't be given, because that oscillates along with the velocity of propagation and at present the forming noise signal still can't be analysed. There can't be bought electronic construction elements, which like a body cell would be able of oscillations of length. Oscillation quartzes and piezo elements, on the basis of which scalar wave detectors could be constructed, form an exception.

Similar to the Lecher conductor different forms of tunable Lecher antennas have been developed. which are used for dowsing. Such a frame antenna, developed strictly according to the rules of high-frequency technology stems from W. Busscher (fig. 23.6)[<i>]. With the short-circuit slider a closed-loop antenna circuit in the upper part is tuned to half the wavelength or an integer multiple of it ($L = n \cdot \lambda/2$ with n = 1,2,3...). The person, who holds the Lecher antenna with both hands, forms the termination resistor for the attached antenna circuit. At the same time he prevents the occurring of an effect back on the tuned resonant circuit by means of damping of the Lecher conductor. The sense of this arrangement is lying in the circumstance that man as a ,,biosensor" should feel if standing waves, which I call vortices, are formed in the Lecher antenna.
A modification of the Lecher air antenna is the Lecher dowsing rod according to R. Schneider[<ii>]. It is produced as an etched board, which has a dielectricity of approx. 4. As a result the velocity of propagation and the wavelength are only half their normal value. In addition a shortening factor V is introduced, which depends on the construction of the Lecher dowsing rod[<iii>] ($L = V \cdot n \cdot \lambda/4$ with V = 0.952 and n = 1,2,3...).
In fig. 23.7 some published tuning values have been drawn up. The values for want of corresponding technical gauges it is true still haven't been confirmed, but they allow a certain insight into the world of the scalar waves, as they are influenced and radiated by water, by metals, by oil or even by other planets, the sun and the moon. Doing so some questions remain open: We for instance don't know, if the corresponding wavelength concerns the basic wave or only an m^{th} harmonic wave. The details not only are unreliable, they moreover also are ambiguous. If however several tuning values L' are present for which resonance occurs, then if need be an integer divisor can be sought and the wavelength can be determined. But that doesn't function always.

<i>: Will Busscher: Die Luft-Lecher-Leitung als Wunschelrute. Eine Methode um die Wellenlangen zu bestimmen. Wetter-Boden-Mensch 3/ 1991, Seite 46-57.
<ii>: R. Schneider: Einfuhrung in die Radiasthesie Teil II: Leitfaden und Lehrkurs ..., Oktogon-Verlag, Wertheim, 2. Aufl. (1984) S. 136.
<iii>: Rohrbach: Radiasthesie, Physikalische Grundlagen und Anwendung in Geobiologie und Medizin, Haug Verlag Heidelberg 1996, Seite 100.

Supposed wavelength λ of the transmitted scalar wave radiation in [cm] λ	of:	(with the different tuning values L´)
32	water	(L´ = 15.5 n/m=2; 10.8 4/3; 7.8 n/m=1; 3.1 2/5)
18	fault	(L´ = 12.9 n/m=3; 8.65 n/m=2; 4.3 n/m=1)
13.6	net I	(L´ = 12.2 n/m=4; 9.6 n/m=3; 6.1 n/m=2; 3.05 n/m=1
	4 m = 16 x 25 cm	(N-S direction) 1.7 n/m=1/2)
	5 m = 20 x 25 cm	(E-W direction)
14.7	net II	(L´ = 11.4 n/m=3; 6.9 n/m=2; 3.5 n/m=1; 2.2 n/m=2/3)
	7.08 m = 30 x 23.6 cm	(NE-SW + NW-SE direction)
13.2	net III	(12.6 n/m 4; 9.4 n/m=3; 8.2 5/2; 6.15 2; 4.1 4/3; 2 2/3)
16.4	radon	(L´ = 7.8 n/m = 2)
28.6	oil	(L´ = 13.5 to 13.8 n/m = 2; 3.3 to 3.5 1/2)
17.2	gold	(L´ = 8.2 n/m = 2; 4.1 n/m=1; 2 n/m=1/2)
13.9	silver	(L´ = 6.6 n/m = 2; 3.2-3.3 n/m=1; 1.6 n/m=1/2)
7.20	quartz	(6.9 4; 4.1 5/2; 3.85 9/4; 2.9 5/3; 2.5 3/2; 2.2 5/4)
4.35	sun	(L´ = 4.15 n/m = 4)
15.3	moon	(3.65 n/m = 1. thermal spectral lines: 11; 21 cm)
4.25	Mars	(4.05 n/m = 4, thermal spectral line at 3.14 cm)
4.90	Jupiter	(4.65 n/m = 4, ther. spectral lines: 3; 3.2; 3.3 cm)
5.36	Saturn	(5.1 n/m = 4, thermal spectral line at: 3.45 cm)

Fig. 23.7: Details of not confirmed wavelengths.<i>
(derived from tuning values of a Lecher antenna
$L' = . V \cdot \lambda \cdot n / 4 \cdot m$ with V = 0.952
and n = 1,2,3... for λ/4, λ/2, 3λ/4, λ, ...
and m = 1,2,3... for 1 the basic wave
and the 2nd, 3rd, ... harmonic wave

_____ according to: _____

<i>: Ludeling, Hartmut: Handbuch der Radiaesthesie, Verlag Eike Hensch 1994, S. 161 ff. The author gives the clue: „The values have been determined empirically by different persons and predominantly could be confirmed by the author and his co-workers. There however always can occur deviations caused by different dowsing methods. Every value therefore always should be checked with own measurements."

23.7 Assignment according to wavelength

As said, the methods to determine the wavelength by means of the Lecher antenna are ambiguous and unreliable. So water should have a wavelength twice as long as a fault. But since water often is collecting or subterranean flowing in faults, one is entitled the suspicion that here $\lambda/2$ was taken, where in reality the full wavelength λ acts. The rest of the table after that should be looked at with the same scepticism. The table nevertheless is not wholely uninteresting, because it points to certain trends and is able to furnish clues, which if need be can represent a help of orientation in the systematic research of scalar waves.
At the planets is remarkable that the Lecher conductor reacts to values, which correlate with the respective thermal spectral lines. If these spectral lines propagate with c and it actually should concern the same cause, the frequency thus should be identical, then the planets would emit scalar waves, which are faster than the light. In the case of Mars 1.35 times the speed of light c would be present, in the case of Saturn 1.55 times and in the case of Jupiter the values would lie between 1.46c and 1.63c. In the case of the moon two thermal spectral lines are being measured, which on the one hand have as a result 1.39c and on the other hand 0.73c. At this place still ample research tasks should be solved.

In the case of scalar waves the wavelength is the most important factor to refer to. The frequency however varies continually, which in electrical engineering is called noise. That again is connected to the circumstance that frequency and velocity of propagation oscillate, so that merely an average value can be given at a time. But that hardly can be measured, which again makes the assignment more difficult. We thus still aren't capable to enter the table values from fig. 23.7 into the frequency diagram of fig. 23.1.

A technical gauge for scalar waves is necessary. A practical solution could look as follows: A noise transmitter tunable in frequency and wavelength operates on top of a carried along noise receiver. The arrangement with that comes the Tesla transmission path for scalar waves very close. If the transmitted noise signal hits upon a likewise one in the surroundings then overlapping occurs, which at the receiver causes a change of the displayed value. If doing so a subtraction (extinction) or an addition (amplification) of the signals occurs is unimportant.
With this arrangement in any case statements are possible about frequency, wavelength, velocity of propagation and about the amplitude of the scanned signal, without withdrawing energy and strain the signal in doing so<i>. With such a gauge radiation conditions depending on location could be measured as well as technical devices checked lor the emitted scalar wave parts (fig. 24.1).
An important use over and above that would be given in medical diagnostics. Every living being „produces noise" the technician would say, it „emits scalar waves" I would say, whereas following general usage is talked about the „aura of man". The value of an aura diagnosis still is completely unknown to most doctors and therapists, especially as the scanning of the aura at present only is possible by dowsing. But the patient expects that a doctor works with a technical gauge and not with a dowsing rod!

<i>: First experiments, which I carried out with students in the laboratory, look very promising. Unfortunately the works at present rest for reason of lack of money.

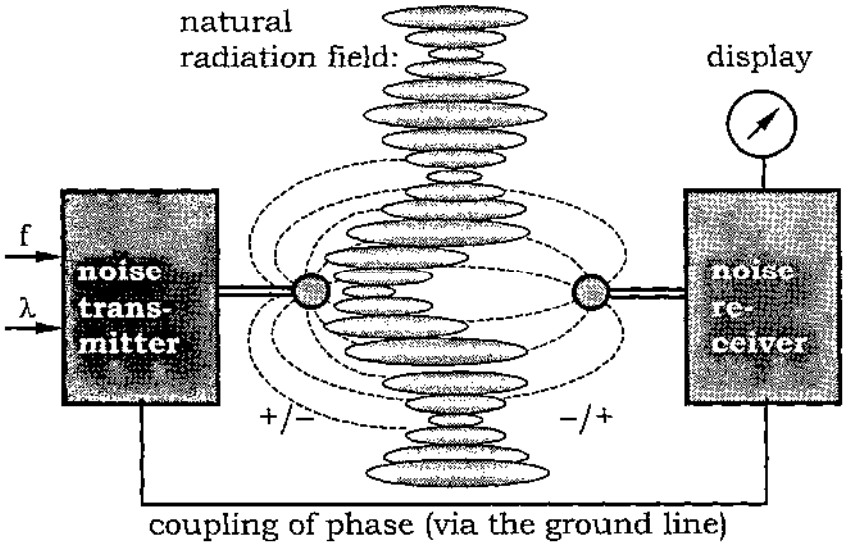


Fig. 24.1:____ Concept for a device to detect scalar waves

24. Medicine of oscillation

24.1 Mediation of information with the help of scalar waves

If for the discussed scalar wave gauge the transmitted comparison signal in addition deviates from the form of a sinus, if the signal is modulated in some way, then even the transmission of information by means of the noise as scalar wave can be realized. If we as an example again take the aura of man, which is more than only a radiation field, it carries information for instance about the state of health of man. Kirlian photography is one form of making it visible (Fig. 3.6).
Not only the nerve conduction and the brain work with scalar waves. Man in this way also corresponds with his fellow people, some more, others less. There are people who „beam" and that should be interpreted in the true meaning of the word. Others opposite to that are more „receiver characters", who pick up more scalar wave radiation than they give away. But because they not only pick up positive radiation energy, they are susceptible to information, which makes sick. That's why a healthy equilibrium in the exchange of thoughts, feelings and the different forms of scalar waves is very important. All that is reflected in the aura of man. If we technically are capable to scan the aura of man, than this can be a blessing for humanity and for the public health.

The possible abuse however must not be overlooked. Unbiased research results, which can be used for the benefit of humanity, in many cases just as well can be used to harm humanity.
A connector of both these worlds is the Russian psychologist Prof. Smirnov, who has shown publicly in television, how a spoken sentence can be transformed in a noise signal, which is taken up directly by the brain as information, with the help of a computer program <i>. He with that is capable to "sodden" individuals, as he says, he in this way can take the fear away from soldiers before a combat mission and can operate the disease out of drug addicts without bloodshed. In the television film such an „operation at the open subconscious"' is shown life. The patient hears the noise signal over headphones and is cured already after few minutes treatment time.

We here are getting in the domain of ethical and moral problems of scalar wave research, which aren't solved by us looking away and leaving the field up to others. According to the words of Prof. Smirnov the only thing, which can stop the research scientist, is his own moral. He doesn't say any more and that isn't exactly reassuring! One here is working with „signals resembling sound", is said in the report of the Zweite Deutsche Fernsehen<i>, thus with longitudinal waves and that shows, that already more knowledge about scalar waves is present than is generally known by the masses.

Another way is leading over the bioresonance. Also here at first the possibility and chance to cure diseases is to the fore. The bioresonance is a central aid in the area of the medicine of oscillation, which is increasing in importance permanently.

<i>: Die Zombies der roten Zaren (Besta Film Warschau im Auftrag d. ZDF 1998)

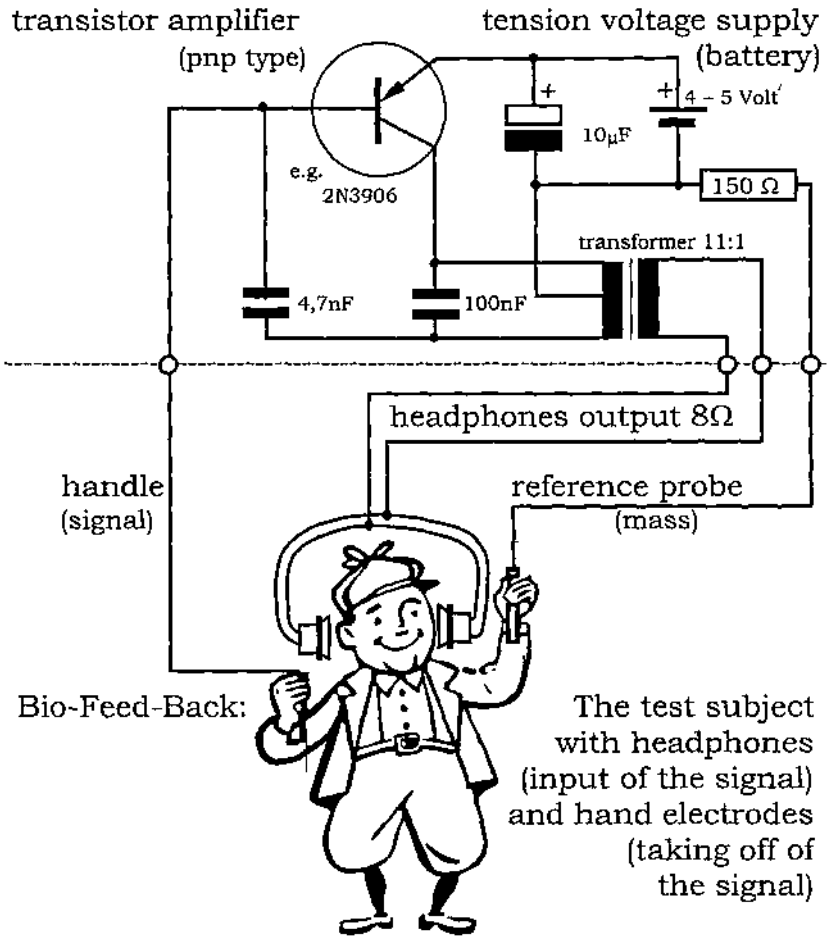


Fig. 24.2 A: Wiring diagram of the Syncrometer.[<i>]

<i>: Wiring diagram taken from: H. Clark: The Cure for All Cancers (1993) New Century Press, USA, Page 434

<ii>: Flanagan: Horen mit der Haut anstatt mit den Ohren, Sonnenwind 1/97, S.13-17.
s.a.: N.Begich: Towards A New Alchemy, The Millenium Science, Earthpulse Press 1996

<iii>: Dr. Bodo Kohler: Biophysikalische Informations-Therapie, Gustav Fischer Verlag (1997), Kap. 11.6 Der individuelle Grundton, S. 239 ff.
s.a.: Dr. Bodo Kohler: Die bipolare Farb-Ton-Therapie, CO'Med 2/2000, S.10 - 15

24.2 Systems with positive feedback

The field of oscillation of man easily can be influenced, because it concerns a vortex field. A technical measurement with the gauges available at present is almost impossible and highly inaccurate. There however exists the possibility, to apply electrodes to a person and to integrate him in the circuit of a technical device. The two of them form a feedback system with man in the return loop. The operation can take place in two different ways, depending on the sign of the feedback (Fig. 24.3):
For positive sign it concerns positive coupling. In this case the signals released by a person sum up, for which reason already minimum amplitudes are sufficient to produce violent reactions in the case of resonance. For resonance to occur, the system must either search independently the suitable frequency and phase, or the therapist searches the points of resonance.

24.2.1 The Syncrometer.

An independently working system is e.g. the Syncrometer. By means of two electrodes, which are held with the hands or are attached directly to the head, the noise signal emitted by a person is called off and supplied to a broadband amplifier. The test subject again hears the amplified signal via headphones, so that the circuit is closed.
Apparently unspecific and still reproducible during operation certain signals capable of resonance are emerging stronger by amplifying and swinging themselves up. The aura starts to extend or expressed in the words of a radiation sensitive, the so-called reaction distance is increasing, with which he means the distance in which he detects a dowsing rod reaction.
The test subject now increases his radiation, so this method can be valued. By strengthening his own radiation power, he works more as a transmitter and less as a receiver for scalar waves. In the last point the therapeutic use seems to iie, because by that the patient can get rid of resonances to any unpleasant persons or to technical transmitters, which are burdening him. The device consequently also is sold as aid or protection against electrosmog.
The amplified signal also can be picked up directly by the skin instead of by the headphones and still being „heard". The reports stretch from a harmonizing and balancing effect up to "electronic telepathy" and states similar to ecstasy of the test subject[<i>].

24.2.2 The sound therapy.

The controlled variant of this method for instance is the sound therapy. Now the sounds, which the patient picks up by means of headphones, do not stem from him but from a sound generator. The therapist goes through the scale and tries to find out at which sound the aura swings up. If the eigenfrequency is found, then the patient can therapize himself, by again and again playing or humming his eigentone[<iii>].
It concerns here only a physical statement on the used methods of alternative medicine and not therefore, whether healing successes are actually possible.

sound frequency equally tempered [Hz]		wavelength [cm]	colour	wavelength [run]
F sharp"	740	46,4	(purple)	-
F"	698	49,1	(crimson)	-
E"	659	52,0	(violet)	-
D sharp"	622	55,1	indigo	421
D"	587	58,4	bleu	446
C sharp"	554	61,9	turquoise	472
C"	523	65,6	green	500
H'	494	69,5	yellowgreen	530
A sharp'	466	73,6	yellow	562
A'	440	78,0	orange	595
G sharp'	415	82,6	orangered	630
G'	392	87,5	red	668

Table 24.2 B: Scale of the colour range.<i>

colour		chakra	sense organ	planet type
purple	7.	(crown chakra)	epiphysis	Jupiter
indigo	6.	(brow chakra)	hypophysis	Saturn
bleu	5.	(throat chakra)	hearing	Mars
green	4.	(heart chakra)	feeling	Sun
yellow	3.	(solar plexus)	seeing	
orange	2.	(sacral chakra)	taste	Venus
red	1.	(root chakra)	smell	Moon

Table 24.2 C: Assignment of colours to chakras and planets.<i>

colour		metals	gems (selection):
purple	7.	tin	amethyst, fluorite
indigo	6.	lead	indigo-sapphire, azurite
bleu	5.	iron	sapphire, lapis lazuli
green	4.	gold	emerald, malachite, jade, gr. tourmalin
yellow	3.		topaz, amber, citrine
orange	2.	copper	carnelian, fire opal
Rot	1.	silver	ruby, coral, garnet, red jasper

Table 24.2 D: Assignment to a selection of gems.<i>

<i>: Dr. Bodo Kohler: Biophysikalische Informations-Therapie, Gustav Fischer Verlag (1997), Kap. 11.6 Der individuelle Grundton, S. 190 - 194

24.2.3 The colour therapy.

Analogous to acoustics also colours each time can be assigned a wavelength and also here can be detected that every person responds to certain colours, thus wavelengths, in particular which can stimulate his aura to resonant oscillations. In practice sound and colour therapy often are used coupled[<i>], even succeeds more or less an assignment to each other. That in last consequence leads to a "scale of the colour range" (table 24.2 B)[<ii>]. According to statement of the treating doctors does a patient, who responds to a certain colour, also react to the corresponding sounds and vice versa.

24.2.4 The aroma therapy.

If according to that it depends less on the circumstance if sounds or colours are used, but the wavelength of an oscillation is crucial, then a stimulation also should be possible by means of the remaining sense organs, e.g. the nose, the tongue or the skin. The smell after all already could be identified as vortex information (fig. 9.0). Fragrances of natural essences can significantly influence the frame of mind. But as long, as we still haven't understood the physics behind it, we technically hardly are capable to generate equivalent vortex modulations artificially.

24.2.5 The gem therapy.

Already the holy Hildegard von Bingen (1098-1179) knew and used the beneficial effect of gems. Physical background of this at first purely empirical form of therapy is the characteristic eigenfrequencies of the gems, which are picked up as stimulation over the skin. Because gems represent a mixture of various molecules, the oscillations in the atomic hull will overlap, so that overlapping and beat frequencies can form with wavelengths in biological relevant areas. There even can form modulations, which are carrying information. The effectiveness again is linked with the resonance condition, which must be fulfilled between the gem and his carrier.

24.2.6 Meditation and self-therapy.

There even exist people, who don't need any technical aid at all to get rid of unpleasant resonances. Some meditate and go into resonance with themselves, whereas others prefer to love a person, to whom they feel „attracted" or with whom they are „on the same wavelength", which means as much that they go into resonance with this person. In the Catholic Church for instance the priests are not allowed to get married, because they should be in a resonance with the church and with God.

<i>:: Dr. Bodo Kohler: Die Coloroma-Therapie, Der aussergewohnliche Einsatz von Aromen, Co'Med 4/2000, S. 48-52

<ii>: Cousto: Die kosmische Oktave, Synthesis Verlag Essen 1984

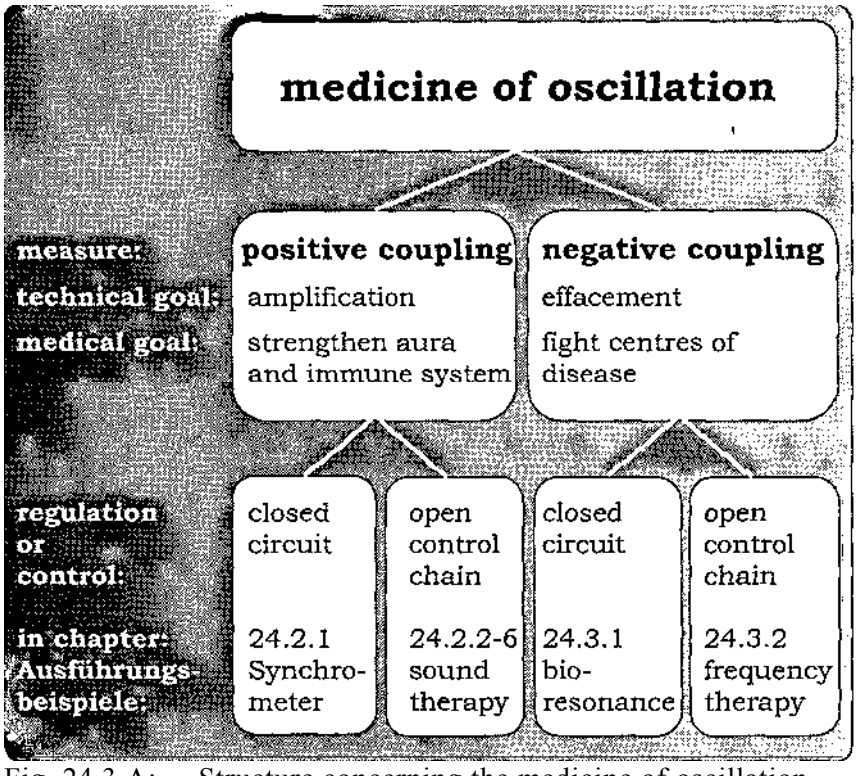


Fig. 24.3 A: Structure concerning the medicine of oscillation

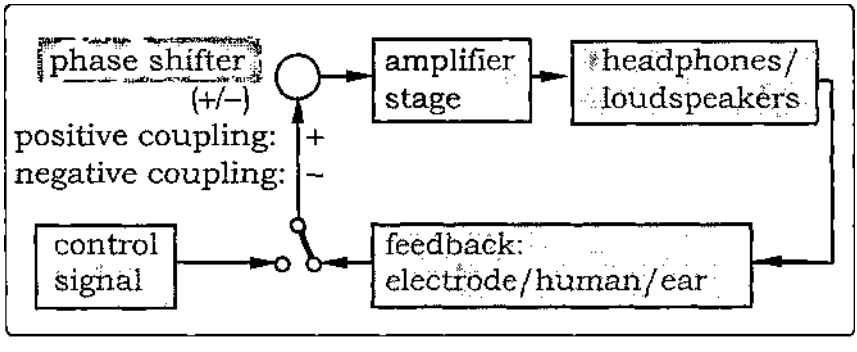


Fig. 24.3 B: Regulation or control?
Positive or negative coupling?

24.3 Systems with negative feedback

For negative sign it concerns negative coupling. In this case the signals are subtracted. The signals released by a person are played back to him with opposite phase. This method lies in the domain of the bioresonance.

24.3.1 The homeopathy

The concept, which is pursued by the medicine of oscillation in the case of the bioresonance, is that harmful or ill making oscillations should be effaced. Not the direct, but rather the indirect strengthening of the immune system is to the fore, which should be reached by relieving it. The approach with that pursues the same goal as the pill medicine, where oscillations, which should produce a wanted effect and which are bound by means of substances are supplied to the body.
The disadvantage of the administration of pills is the often toxic effect of the carrier substance. The German doctor Samuel Hahnemann (1755-1843) has demonstrated a way, in which to make the helpful and important information for the body to go over from the carrier substance to the water by diluting with water and by shaking. The water molecules now oscillate in time of the carrier molecules. Interestingly in doing so not even the information gets lost, the modulation thus is preserved. By constantly shaking there even occurs an amplification or a „potentiation", as Hahnemann expressed himself, because now every carrier molecule reaches and modulates countless water molecules. Thus the amount of water informed is bigger than the amount of the original chemical substrate. In the case of homeopathy like is treated with like. If for instance a poison causes certain complaints at a healthy person, then in "homeopathic" administration this information helps a sick person with similar complaints. There thus occurs a disturbance activation with opposite phase, as the engineer uses to express himself. Despite a widespread scepticism the method of homeopathy indeed seems to function, and it has stood the test in countless cases.

24.3.2 The bioresonance

A technical realization is represented by the bioresonance. For that endogenous oscillations are called off by means of an ECG (electrocardiogram), an EEG (electroencephalogram) or a MEG (magnetoencephalogram) at the surface of the skin. The technical device then shifts the phase for 180 degrees and amplifies the signal to the extent that pathological frequencies are extinguished for reversely directed input. This very reasonable theoretical concept in practice of course only is as efficient, as the empirical determined pathological frequencies are the cause of a disease and not only represent an unimportant symptom as side effect.
To that technical problems are joining. Prof. Heine blames the constantly changing reaction diversity and the thermal noise for the circumstance that the „frequency spectrum permanently is fluctuating", as he writes if*. That hardly can realize the necessary phase inversion. We meanwhile know that vortices have a fluctuating frequency spectrum, that in the case of biosignals it concerns such field vortices, which result in a noise signal unspecific in frequency.
With this knowledge we should be able to significantly improve bioresonance procedures, and even the inversion of phase shouldn't represent an insurmountable difficulty anymore.

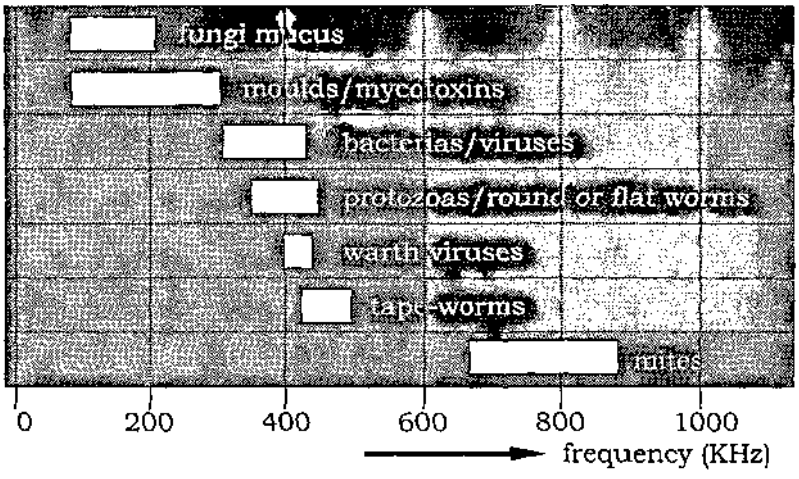


Fig. 24.3 B: Frequency spectrum of parasites according to Clark.<i>

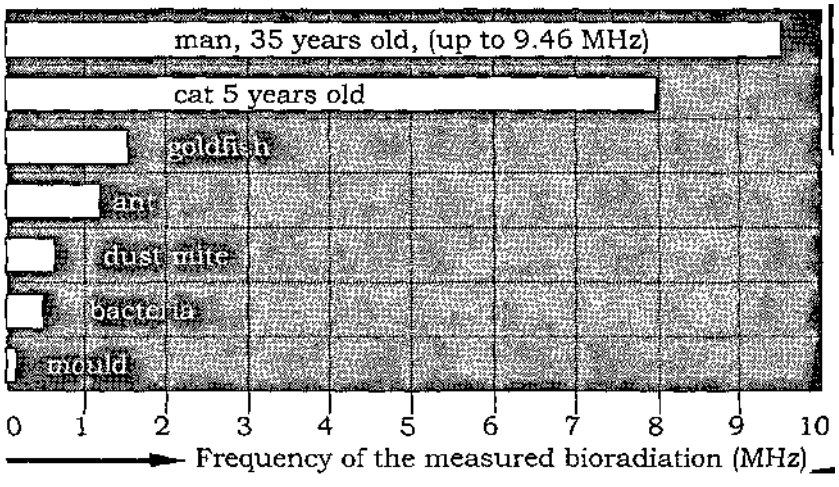


Fig. 24.3 C: Diagram of frequency ranges for some living beings.<i>

<i>: Dr. Hulda Clark: The Cure For All Diseases (1995), Page 604-643

A further problem, which Heine addresses, can't be denied[<ii>]: „For communicative molecule oscillations the microwave range of 1 GHz up to above 10000 GHz is crucial. A calling off of endogenous interference oscillations in this range with the help of normally used electrodes is not possible"[<iii>]. It thus could happen that essential frequencies, which are directly related to a disease, aren't recorded at all and as a consequence also not treated. There even is the risk of informations being brought in, which additionally stress the immune system instead of relieving it, that the patients after a treatment are worse off than before. The doctor or therapist is burdening himself with a big responsibility, when, how and at whom he applies methods of bioresonance or if he better does without them. For the mentioned reasons the method in the therapy only plays a secondary role. The bioresonance on the other hand is quite often and with great success used in the diagnosis (Nosoden), if it for instance concerns the determination of an incompatibility or an allergy - but that is a completely different theme. For the bioresonance the transition of diagnosis to therapy is however floating.

24.3.3 The frequency therapy

If using a frequency therapy the problems are standing similarly. If we separate the closed and negatively fed back circuit of a bioresonance and form an open control chain consisting of a technical control device and the patient, then we get the structure, as it is put to use in a frequency therapy. The goal still is the same: parasites or pathogenes, which stress and burden the immune system should be fought.
But a disadvantage of every open control chain is that the treatment at first occurs blind due to the missing feedback.

The natural healer Dr. Hulda Clark has examined as support various pathogenes and parasites under the microscope, while she has varied the frequency and at the same time applied a low-tension voltage. Doing so she could observe the dying of bacterias and parasites at certain frequencies. Correspondingly she publishes tables, in which the in each case „mortal" frequencies are listed[<i>].
Hut without being able to verify the success of a treatment in the living organism, she proceeds from the assumption that by applying a low tension voltage (5-10 Volt), as it is produced at the output of a commercially available frequency generator, if a sinusoidal signal is set with the appropriate frequency exactly the associated parasites and leeches will be destroyed. Doing so a fixed rhythm of pauses and treatment times must be adhered to (7 min on, 20 min off, 7 min on, 20 min off and 7 min on).

The doctors and therapists treating with this particularly inexpensive method report amazing results, inexplicable spontaneous cancer cures, like of HIV-positive patients, who after the treatment were tested HIV-negative. But also the inverse case already should have occurred, that a HIV-negative patient afterwards was HIV-positive! Here too clear the limits of this method appear, which in practice unfortunately turns out to be relatively unspecific.

<ii>: Prof. Dr. H. Heine: Grundregulation und Extrazellulare Matrix - Grundlagen und Systematik, Lehrbuch der biologischen Medizin, (1991) 2.Aufl. Hippokrates Verlag Stuttgart, Seite 63

<iii>: U. Warnke: Bioresonanztherapie - Wunsch und Wirklichkeit. Medizin transparent Nr.2 (1996) S. 36-37

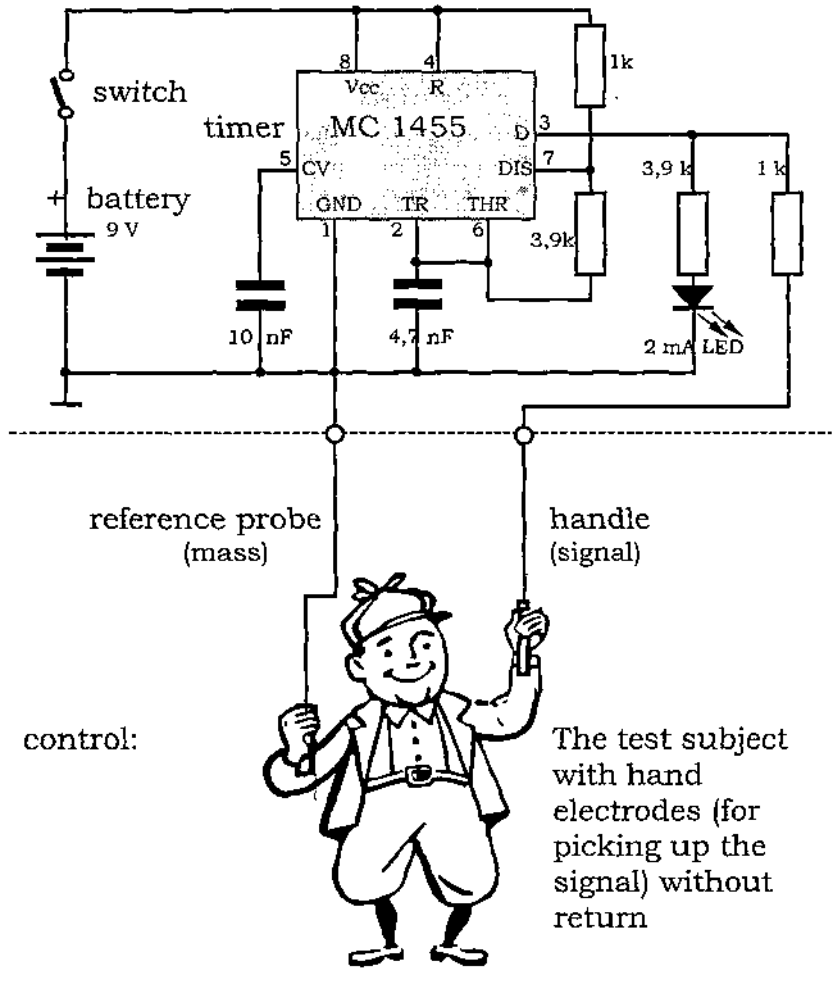


Fig. 24.4: Wiring diagram of the Zapper.<i>

Wiring diagram taken from:
<i>: H. Clark: The Cure for All Cancers (1993) New Century Press, USA, Page 507, resp.:
Dr. Hulda Clark: The Cure For All Diseases (1995), Page 48

24.4 The Zapper

From the point of view of physics of today the frequency therapy actually shouldn't be able to function at all. The electromagnetic waves penetrate only few millimeters into the skin at the used frequencies and wouldn't have the slightest chance, to reach a parasite, which is staying somewhere in the body. But it is said that it is possible to cure athlete's foot, by the patient taking the electrodes in his hands. How, we ask the question, does the signal of the function generator know where it should go?
It quite obviously concerns a resonance phenomenon. The likewise emitted scalar wave part tunnels undamped at those places in the body, with which it can build up a resonance and that for proper tuning are the unloved parasites. The scalar wave radiation is bundling up at the resonant receiver, so that despite the low transmission power as a consequence of the bundling up the energy density for the parasite becomes very high. It as a result is destroyed by its own ability to go into resonance. Once it is killed, the next one goes into resonance, logs off as well etc. In this way the parasites are destroyed one after another and not all at once. That's why the specified treatment cycle makes sense.
The copper electrodes should not be taken in the hands directly, Dr. Clark recommends, but before be wrapped with moist paper. By means of this insulating layer, so is my interpretation, the conventional wave part, for which the skin functions as a wave guide, is reduced whereas the desired scalar wave part is increased. Such measures crucially contribute to the success of a therapy method, even if they were determined purely empirical.

If one wants to address every possible parasite individually, then the treatment takes correspondingly long. If one on the other hand sends all relevant frequencies at once by overlapping them, then the treatment can be abbreviated to the duration of one session. If the therapist goes still further and replaces the sinusoidal signal by a rectangular signal, then infinitely much sinus functions are hidden in it, as a Fourier analysis shows. With a rectangular signal, as it is delivered by the Zapper, one as it were catches everything, Good as well as Bad. There the helpful intestine bacterias break exactly like the wrongdoers.
The treatment with the Zapper is simple, inexpensive and exactly as controversial. It is the shot with the shotgun in the forest. One always hits something. We nevertheless must ask the question, why one only hits parasites and bacterias and not the vital organs? Aren't those damaged also?
Now then, the signal of the function generator is not modulated; it doesn't carry information. That's why only monocellular parasites, which don't know information exchange, are capable of a resonance. Human cells and more than ever whole organs on the other hand work with complex modulations, which effectively prevent any formation of resonance with the technically generated basic wave, with which the question would be answered so far.
That however also means that immune reactions can be expected: If the first treatment with the frequency therapy still is successful and all simple parasites could be hit, then only further evolved parasites have been spared, which modulate their information. They now breed and can't be reached anymore in further sessions. The method suddenly doesn't function anymore, the therapist finds out, the body apparently has become immune.

scale:		diatonic	chromatic	spiral
sound:		•1/C =	equally tempered	(medieval)
octave	C´	2/1 = 2.0	2.00 →	2/1 = 2
		1.07 = 16/15		1.33 = 4/3
seventh	H	15/8 = 1.88	1.89	3/2 = 1.5
		1.125 = 9/8		1.125 = 9/8
sixth	A	5/3 = 1.67	1.68	4/3 = 1.33
		1.11 = 10/9		1.07 = 16/15
fifth	G	3/2 = 1.5	1.5	5/4 = 1.25
		1.125 = 9/8		1.04 = 25/24
fourth	F	4/3 = 1.33	1.33	6/5 = 1.2
		1.07 = 16/15		1.03 = 36/35
third	E	5/4 = 1.25	1.26	7/6 = 1.17
		1.11 = 10/9		8/7 = 1.14
second	D	9/8 = 1.13	1.12 →	9/8 = 1.125
		1.125 = 9/8		10/9 = 1.11
first	C	1/1 = 1.0	1.00	11/10 = 1.1

goes towards 1!

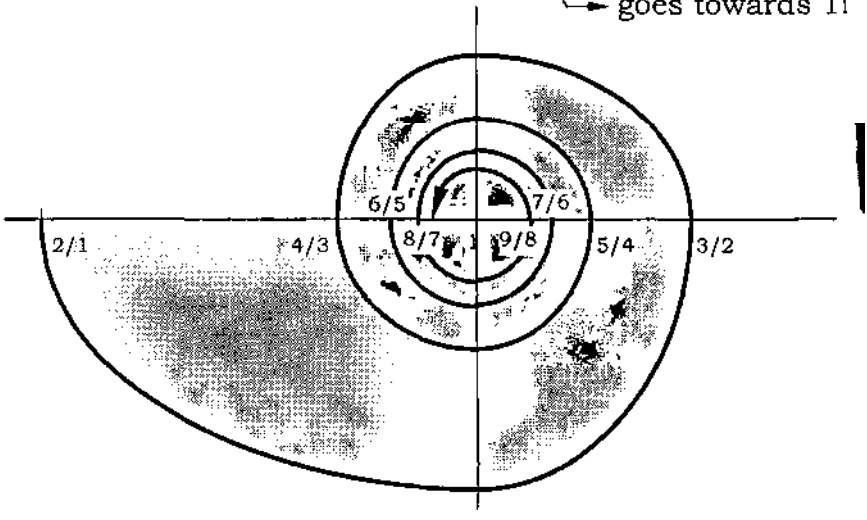


Fig. 24.5: Harmonic spiral built on the first Gregorian scale.[<i>]

<i>: Dr. Manfred Doepp: Naturgemasse Frequenztherapien, Die Harmonie der Snirale. CO'Med 10/2000. S. 46 - 49

24.5 Discussion concerning the medicine of oscillation

The textbook medicine in its explanations and treatment methods is basing on the models, which it can measure and analyse and which it understands. Doing so man and whole nature is reduced to a handful of chemical reaction formulas. The whole pharmaceutic industry lives on this misleading path, which long ago has revealed to be a dead end, medical as well as financial. This health service cannot be paid anymore and we should ask the question if it actually is worth the money, if with electric signals of minimum power can be obtained effects comparable to the effects of the pill medicine.
We need a new medicine, a potential vortex medicine. First of all we should research how an organism covers its energy needs and how it communicates. There leads no way past the scalar waves and the newly discovered potential vortices. Chemical processes as they are being observed, occur by the way, that is beyond doubt, but they by no means are the cause. Hence of pills and other chemical means at most a treatment of symptoms and a case of side effects may be expected but not a cure of a disease. Once the potential vortex medicine will be systematically explored and be put to use in practice, healing successes can be expected, which we at present can't imagine at all.
The amazing results, which already today are obtained in the medicine of oscillation and of which some doctors can report[<i>], dictates the direction in which the textbook medicine should develop. In the question, which kind of oscillation or which ,,sequence of sounds" (Fig. 24.5) is the right one, still exists considerable need for research.
Some doctors even already work with my new theory and cite whole passages from my publications until now about this theme[<ii>].

<i_a>: Dr. Bodo Kohler: BITsyn, der neue Weg in der Informations-Medizin, Jubilaums-Schrift der Internationalen Arzte-Gesellschaft fur Biophysikalische Informations-Therapie, Bad Nauheim den 6.-8.10.2000, Seite 48 - 56.

<i_b>: Bioenergetische Messverfahren in Theorie und Praxis, Vortragsband der Gesellschaft fur Energetische und Informationsmedizin e.V., Universitat Stuttgart am 17.7.1999.

<ii_a>: Dr. Johann Lechner: Storfelddiagnostik, Medikamenten- und Materialtest, Teil 2 aus der Reihe: Praxis der Ganzheitlichen Medizin und Zahnmedizin, Verlag Dr. E. Wuhr (2000), Kap. 2.4.2 Beruhrungslose skalarwellentragende Informationsubertragung S. 173 ff., bes. Kap. 2.4.2.3 Seite 175, 176.

<ii_b>: Dr. Reichwein, Peters: Zellulare Elektromagnetische Systemsteuerung, Der Freie Arzt 5 (2000) im Wissenschafts-Forum (Anhang, S. IV - XXIII).

<ii_c>: Dr. M. Doepp: Tesla-Wellen, Neue Studien, CO'Med 5/2000, S. 94 - 95

Frequency spectrum of the human organism:

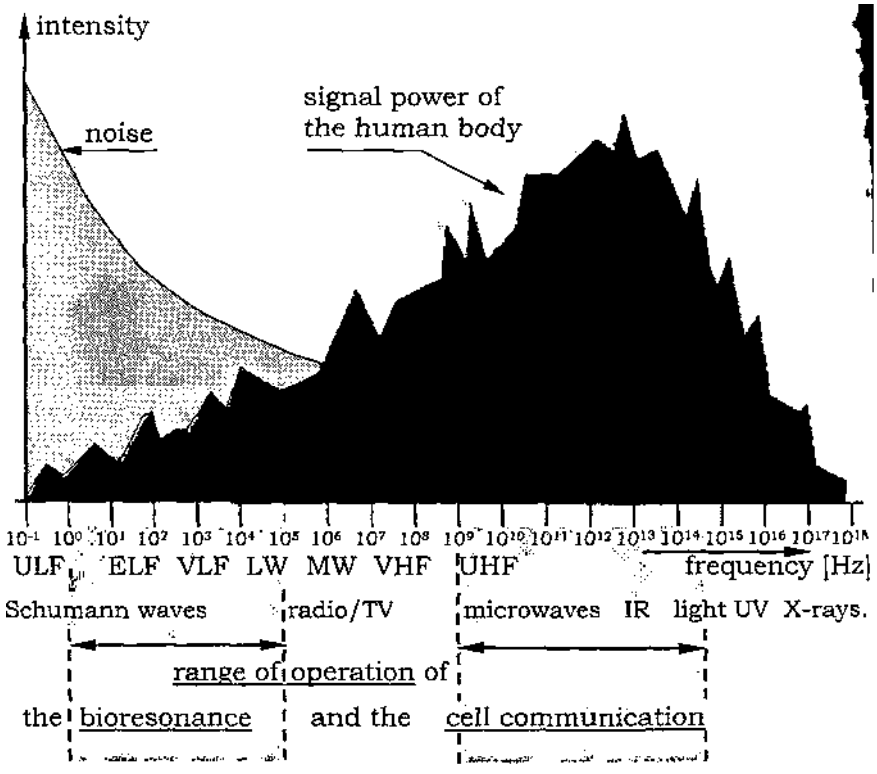


Fig. 25.1: The measured frequency spectrum of man.<i>

<i>: Dr. P. Bembenek: Akupunktur und (Bio-) Resonanz, CO'med 6/98, S. 50-58

25. Contributions to the discussion concerning the information technical use

The medical research predominantly takes place with statistical methods. This might be changed fundamentally, if only the physical relations have been realized and their causes found out. Only then a basic research will be possible also in the area of medicine, as it today already is usual in other disciplines.
In this chapter it concerns the question of the medical basis in general, and specifically the question of the use of the newly discovered potential vortices in biological systems. Doing so very aware is attempted to put the normally used medical view at the back and to derive the answers from the perspective of the engineer and the physicist. This approach is unfamiliar, so that some textbook physicians will have difficulties to follow. It however will prove to be very helpful. Medicine in addition needs new impulses and that justifies a new approach, like the unconventional one proposed by me.
In this connection gladly is fallen back upon the comparison of biological with technical systems, although here exist differences in principle and fundamental It can be expected that nature has developed very appropriate strategies to solve certain tasks, as it also is teached in engineering and used in practice. At this place not only medicine benefits from new insights, engineering vice versa also can learn of nature, because natures optimization strategies are much much older and correspondingly perfect.

25.1 Window of the sensuous perception

To clarify the inner processes in man we consider his sense organs, which function as interface to the outside world. Technically seen in the case of the sense organs it concerns measurement converters to record and process certain physical values in our environment and their adaptation to pass on the information by means of the nerves. The measurement converters thereby are built more or less complex, which is related to the circumstance that the measurement factors, which a living being needs to orient itself and to be able to survive, are quite different.

It concerns little windows within the frequency spectrum shown in fig. 23.1, which should be analysed. Man for instance chooses the visible frequency window and interpretes it with an assignment to the colours, because in this range the sunlight can reach the surface of the earth and the ionosphere doesn't exert an excessive damping (fig. 2.8).

The acoustic window depends on the sound propagation in air, whereas dolphins work with ultrasound, which carry considerably further in water. The associated measurement converters, the ear and the eye, have a very complex structure. From this can be inferred that here the received signal must be transformed into a different physical measurement signal, that the perceivable signals are of other nature than the signals, which our nerves are able to pass on.

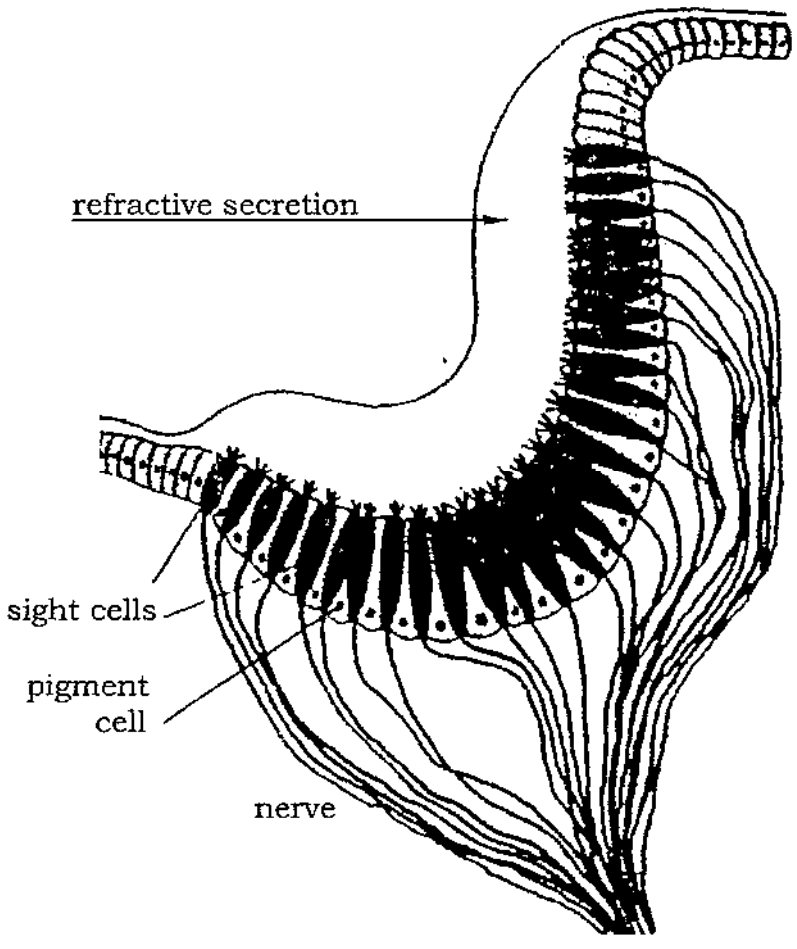


Fig. 25.2: ____ The hollow eye of the snail

25.2 The sense organs (nose, eye, tongue)

If we want to find out something about the nature of the nerve signals, then we should more detailed consider a sense organ, which is constructed if possible simple. In that case it is possible that no signal transformation is necessary at all anymore, because the perceivable variable is exactly of the kind the nerves can process.

The primary and perhaps most ancient sense organ of the living beings is the nose. It is constructed extremely simple. On the one hand according to encyclopaedias it is a chemical sense for the perception of smell materials. Man on the other hand can distinguish several thousands of scents. For that a huge analysis factory with correspondingly much receptors would be necessary, which one searches in vain in the nose between the nasal hairs and the nerves. We from that infer that scent should consist of particles, which are to a large extent identical with the reaction potentials. It thus will concern potential vortices. These ring-like vortices of the electric field again are modulated and carry information, which our brain is able to analyse.

According to the derivation in chapter 9.0 Plato already 2400 years ago knew such relations. The conclusion is obvious that smell is vortex information, which according to the explanation of Plato forms at the transition of waves in potential vortices and vice versa. At the natural philosophers in antiquity the circle of the insights is closed. Modern science just isn't that far.

The hollow eye of the snail functions both as nose and as eye (fig. 25.2). This very ancient combined organ points to a relatively close affinity between both measurement sensors. Possibly in the course of evolution both organs have developed from such a common original form.
In the case of man the smell rods occupied with the nasal hairs of roughly 2 micrometer in length, actually remember of the rods and cones in the eye, with which photons are collected. In both cases, so we can explain the mode of action in accordance with model, the ring-like vortices settle on the rods and run as reaction potentials along the nerve to the brain, which then analyses the modulation.
In the case of the highly developed human eye the light rays first have to traverse the vitreous body and afterwards a pigment layer, before they reach the rods and cones. In this way the electromagnetic wave parts must roll up to vortices, since our nerves can only pass on vortices. The photons can be interpreted as corresponding vortices.
If we compare the eye with a bubble chamber, in which the tracks of ionized particles can be observed and photographed as thin white fog stripes. Here in collision experiments it can be proven that it concerns particles carrying impulse and not waves. But the measurement setup by no means does answer the question if it already concerned particles before they entered the bubble chamber, or if these have formed spontaneously in the presence of the saturated vapour.
It would be obvious, if for our eye the chamber water being under the inner eye pressure would take over the function of the bubble chamber and would take care of the rolling up of the light waves to light quanta.

Example tongue:

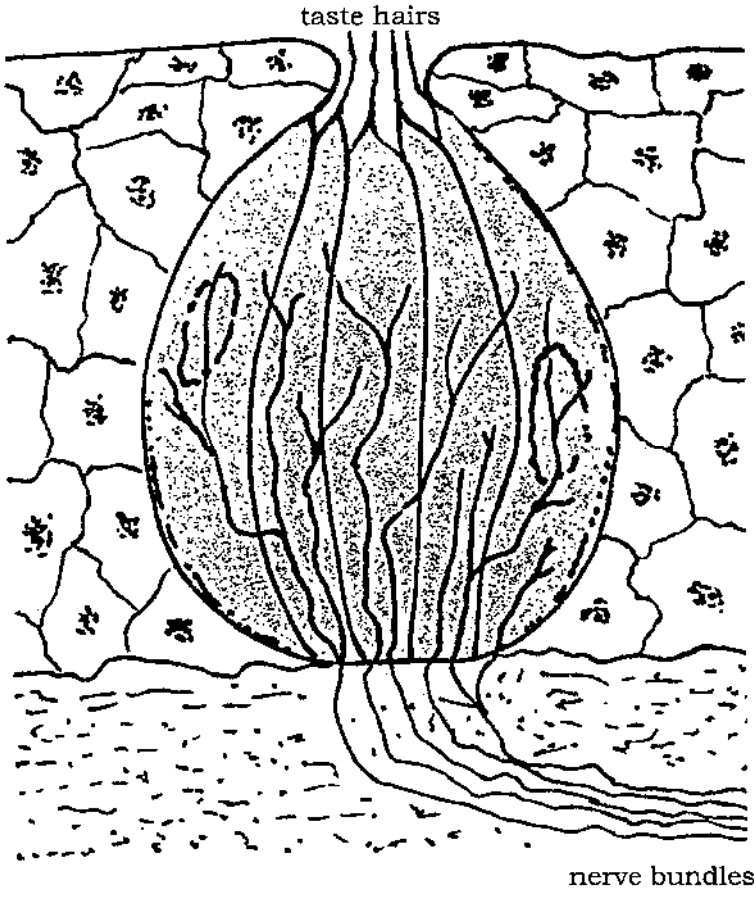


Fig. 25.3: Taste bud of the human tongue

We optically can't detect a difference, if the light while passing through a thick glass plate increases its part of photons. At the latest in the eye in any case all the light is transformed in photons and usable vortices, so that we mustn't detect a loss of brightness. The glass plate seems transparent to us, even if the sunlight should change its composition and its biological quality, if it passes the plate.

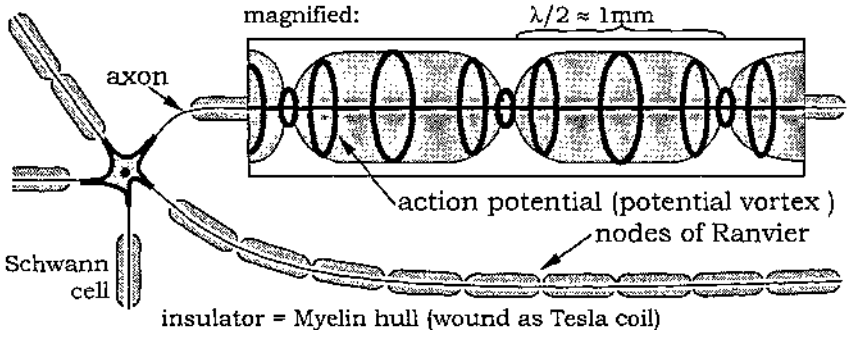
If the tongue while tasking responds to dissolved substances, then it not by all means needs to be a chemical excitation. Instead fine hairs, the taste hairs resp. sense pins, serve as receiver like in the case of the nose. The similar structure of the receptors and the circumstance that for most invertebrates sense of taste and sense of smell can't be distinguished of each other at all and consist of the same primary sense cells, suggest that the tongue doesn't analyse the chemistry as such, but only the molecular oscillation patterns, that also the taste is nothing else but vortex information!

25.3 The nerve conduction

For the collection of the potential vortices and the extraction of their information fine hairs in the sense cells obviously play a central role. They are connected more or less directly with the end of a nerve and pass on the information without big transformation. Even in the organs of equilibrium sense hairs work.

From the comparison with the technique developed by Nikola Tesla I could show that the nerve conduction concerns a single-wire transmission, a kind of waveguide, for which the transport of the excitation information takes place in the insulation layer and not in the conductor itself (fig. 9.6). As proof I quoted that the thickness of the insulation determines the velocity of propagation, that as is well-known the nerve conductors with thick fat layer pass on their action potentials faster than those with thin insulation.
Particularly interesting is the observation, how the fat layer is constricted in fixed intervals, like for Wiener sausages (fig. 25.4 A). These nodes of Ranvier prove that only longitudinal waves are being transported, which are standing waves with nodes and antinodes, if the distance from node to node exactly corresponds to the distance from one node to the next. With that nature with the use of the potential vortices is far ahead of our power engineering. The nerve-cables determine with their structure, which signal will be transported and which not!
The technical cables on the other hand are stupid and conduct everything, the useful signal just as well as any arbitrary interference signal. Anyone, whom the computer crashes every few minutes, knows what I'm talking about.
Man isn't able to afford a crash of his think computer. It would be lethal for him. His nerve costume even tolerates short-circuits. The acupuncture is such a short-circuit technique by means of electrically conductive needles. There even is given a therapeutic benefit and a relaxing effect for the body.
Cut through nerve fibers even can partly regenerate again, even without a cut through nerve again growing together with its other end. The nerve conductors are so intelligent, that only the matching information arrives at the end by passing on informations from one fiber to the corresponding next with the same node interval.

A. Nerve conduction with nodes of Ranvier (to transmit standing waves):



B. Single-wire transmission according to Nikola Tesla<i>:

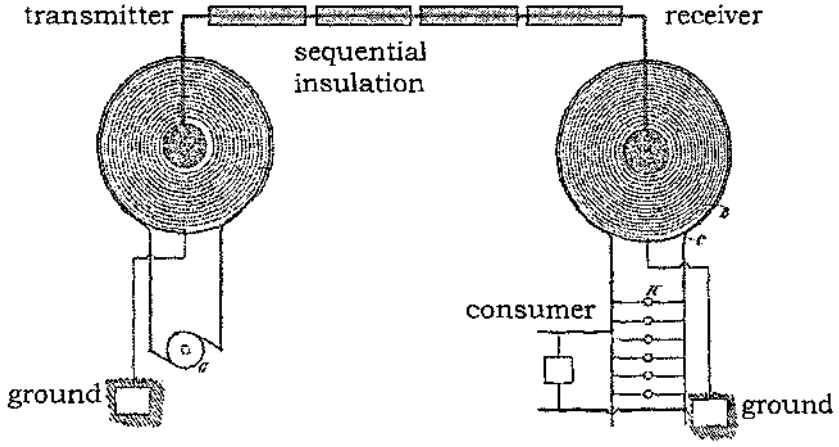


Fig. 25.4: ____ Selective scalar wave signal transmission

The brain works with scalar waves! Reasons are:

1. Lacking of a signal transformer between the nerves and the brain.
2. High performance density of the think apparatus.
3. The brain activity measurable from the outside with the EEC
4. Spark formation and corona discharges at open top of the skull.
5. Insulation defect occurring in the case of epileptics.

<i>: Original sketch of Tesla is situated in the Nikola Tesla Museum, Belgrade.

Nerves represent an intelligent and at the same time interference safe wiring, which is superior to any technical solution by far, or you can try to acupuncture a cable cord of your computer. You will have little pleasure of it.
Nikola Tesla also in this point was ahead of the times. He has experimented with a single conductor technology, for which the insulation layer is constructed like for a nerve fiber (fig. 25.4 B). We'll have to learn to handle such aids in the future, if we in engineering want to emulate nature and as well want to send informations as scalar wave. A normal power cable as said conducts everything, useful as well as interference signals. If however the signal should be accomodated in the noise, a selective cable is required, which should be constructed according to the example of the nerve conductors. Before a scalar wave technology can be introduced and successfully used according to that completely other cables, coupling elements, amplifiers and other components should be developed. The trouble should be worthwhile at the chances, which this genial technology offers us!

25.4 The brain, a scalar wave computer

The brain cells (neurons) are of the same kind as the nerve cells. Hence can be done without a signal transformer, can the informations transmitted by the nerves to the brain directly be processed further. From that follows that also the brain without exception works with potential vortices. There are several reasons for this hypothesis:

1. as said, the lacking of a signal transformer.
2. the high performance density of the think apparatus. (As a result of the concentration effect of the potential vortices the efficiency of the human brain is in such a way high concentrated compared to the much more space claiming computers functioning on the basis of currents).
3. the brain activity measurable from the outside with the EEC
4. spark formation and corona discharges at open top of the skull. (Brain surgeons can report of such observations).
5. The insulation defect occurring in the case of epileptics. (During a fit instable potential oscillations of the nerve cells occur, which lead to strong electric blows).

With the ,,exciting" and the inhibiting"' synapses as separation point between the neurons both a ,.high-active" and a ,,low-active"' method of operation is possible and with that a redundant, particularly interference safe signal transmission.
Safety for interference is very important not only in nature. In the operating instructions of a PC can be read: ,,operate only at room temperature, keep dry, don't throw or shock, take cure for sufficiently cooling air, ground apparatus, pay attention to mains voltage, etc". A comparison with the range of operation of man is like scorn.
Nevertheless the consequences if errors occur are quite similar: a garage door, which opens if a mobile is switched on, by all means can be compared with a light phenomenon, which we perceive after a blow on the eye at the biological level.

Concerning signal technology:

The **comparison** of	**man** and	**engineering**
signal line:	**nerves**	**cables**
transmission:	selective (nodes of Ranvier)	indiscriminate (with interferences)
of:	scalar waves	currents
by:	potential vortices	charge carriers
running of cables:	1-wire technology	2-wire technology
over:	wave guide	supply and return cable
signal transport:	in the insulator	in the conductor
signal form:	concentrated	expanded
the conductor:	stays cold	gets hot
result, transmission:	without losses	with losses
error signal:	muscle cramp	malfunctions
metal pins:	**acupuncture**	**short-circuit**
cause:	relaxation	destruction
directional signal by:	synapses	diodes/ amplifier
redundancy by:	exciting and inhibiting synapses	high-active and low-active drivers
precaution:	skin resistance	shielding
by:	salt	metal case
strategy:	vortex decay	field displacement

Fig. 25.5: Comparison of the signal technology

25.5 Concerning signal engineering

By means of a technical analysis of biological relations completely new interpretations result also for the occurring of a disease. We permanently and everywhere are surrounded by noise signals, but as a rule they can't touch us, because the body has developed perfect strategies for defence. The nodes of Ranvier on the nerve bundles here are just as helpful as the diode effect of the synapses. By means of the salt content and the skin resistance the body in addition controls the uptake of potential vortices from its surroundings, by using that the vortex decay is determined by the conductivity.

The specialties of the by humans used signal technology come to light particularly clear if compared with the cable technology used in the technical world (fig. 25.5). So is worked with only one wire instead of with supply and return cable, are mediated potential vortices instead of charge carriers, does the transmission take place in the insulator without losses and not in an electric conductor, which as a result gets hot and produces current heat losses. Nerves thanks to their ability of selection represent an intelligent form of signal transmission, by helping to filter the asked information from the noise. This surely is necessary since with cables, which indiscriminately transmit every signal, an use of scalar waves hasn't succeeded yet. We should try to learn of nature!

A special challenge is the protection against error signals. A passive shielding by a metal case however is not possible, because scalar waves can't be shielded by principle, so that the precaution should be taken actively by means of the conductivity. That's why we sweat salt if we strain us physically, whereby the vortex decay is determined by the conductivity, which depends on the salt content of the body liquids. In the case of a sweating activity the body reduces its conductivity, so that the needed potential vortex energy will reach the cells.

If the body sometime isn't able to defend itself against interference signals, then malfunctions or pathological reactions are a possible result. During having a bath for instance a muscle cramp can occur, if the body doesn't defend itself fast enough or sufficiently against the high potential vortex activity in the water. Now vortices can be picked up in the nerves, which are of the same kind as the ones emitted by the brain, only that both muscles, biceps and triceps at the same time get the signal to contract. The result is a cramping of both muscles.

Thus the brain has developed intelligent strategies to protect itself of interspersed misinformations. It weighs the incoming signals and forgets again all unimportant ones more or less fast. We speak of the ability to learn and that means that signals rise in the valuation scale and with that are stored longer, the more frequent repeated our brain receives them. This strategy assumes that interference signals only occur sporadic, for which reason they are rated unimportant and fast are again forgotten.
A PC on the other hand doesn't have such a property. It notices everything indiscriminately and sometime will crash of overload, if not the user will constantly foster it and will administer the available memory. A PC is and stays stupid.

Concerning the stability against interference:

The **comparison** of	**man** and	**engineering**
in the	**brain**	**computer**
control technical interference signals:	light phenomena	miscontrol, program fault
precautions:	active, i.e. weighing of the Info by learning (repetition)	passive, i.e. shielding. (no evaluation of the input values)
unimportant (interference signal)	is forgotten	is stored
danger exists for signals	recurring interference patterns (see mobile telephony)	interference of all kinds (s.EMC-standardization)
remedy:	self-cure	restart (reset)

Concerning set of difficulties of wear and tear:

The **comparison** of	**man** and	**engineering**
repair by:	self-repair cell division permanently	in the workshop exchange parts at maintenance resp. in the case of damage
required building materials:	nourishment	material / oil
waste:	compost	rubbish

Fig. 25.6: Strategies against interference signals, for damages linked with operation and for wear and tear.

25.6 Stability against interference and repair mechanisms

The interference signals present in our natural environment as a rule are distributed stochastic, but not so artificial interference signals like for instance transmitters emit. If for instance in the case of mobile telephony there occur time and again identical signal patterns and if a person perceives these, then because of the continual repetitions a high importance is pretended and precious storage space in the brain is allocated. This to a special extent applies for the permanent stand-by signals, which are emitted by mobiles and cordless phones even then, if we don't phone at all. Such misdevelopments thereby would be technically avoidable just like that!
If still no gauges are available and as a result there exist neither guidelines nor limits for the radiation exposure of scalar waves, then such devices must be developed and built. For the requested electromagnetic environmental compatibility not engineering, but man should be in the centre of attention!

Let us throw a short glance at the set of difficulties of wear and tear. Most technical devices find the way into the workshop only, if they already are defect. Some aren't repaired anymore in principle and immediately sent to the rubbish, because they are worn-out and a repair isn't worth the effort anymore one says, whereas other, mostly expensive systems are being serviced by exchanging all wearing parts.

Nature has brought to perfection the last principle. It allows the body a permanent maintenance; by permanently producing new cells and replacing consumed ones. It with that obtains a considerably longer operating time and even is capable to heal wounds. Just imagine dents in our cars would disappear from alone after a few weeks and the bodywork would look like new. Such an optimal maintenance is costly and it has its price. By means of the cell division the building plan for the spare parts is copied. The task on the other hand is transmitted to the new cells „by radio" by means of waveguide channels, as proves the matching structure of scalar wave and waveguide (chapter 21.12 and fig. 25.7). The cells hence have a kind of „decentral intelligence", which technical matter lacks completely. A comparison with engineering nevertheless makes sense, because wear and tear occurs for all systems in continuous operation. Thus strategies must be developed to provide the necessary material for operation, building-material and exchange parts.

By sizing of the hyperboloid structures of the matrix channels it should be possible to determine the wavelength of the scalar waves to enter them in the frequency diagram (23.1).

Tunnel structure of the basic substance according to Prof. Heine[<i>]:

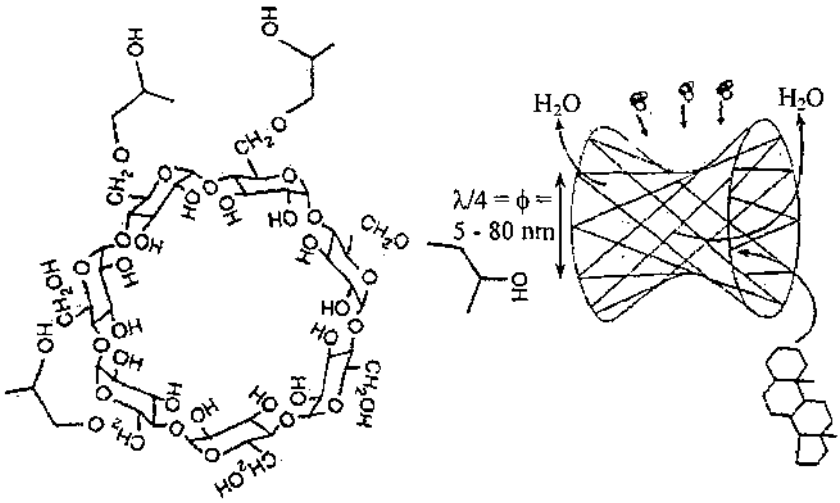


Fig. 25.7: ___ Information channels in the intercellular matrix.[<i>]

<i>: Hartmut, Heine: Lehrbuch der biologischen Medizin. Grundregulation und Extrazellulare Matrix, 2. Aufl. 1997, Hippokrates Verlag Stuttgart, S. 56

25.7 The microwave window

There still is lacking information about the frequency or the velocity of propagation to be able to specify and enter in figure 23.1 the cell information. Let's take to hand the book about "Biostrahlen"[<i>]. In there is explained how for individual cells the emission of electromagnetic signals already could be measured, which are interpreted as circularly polarized waves (fig. 21.10 A). It is said that thereby their polarization plane is rotating with the speed of light, whereas the wave itself is propagating in longitudinal way relatively slow and according to the authors with the speed of sound.
The occupation with the potential vortex theory in the explanation lets immediately recognize the vortex, for this is rotating with the speed of light in circles as rolled up wave (fig. 21.10). If it is bound to the surrounding matter with closed vortex centre, then it can be expected that the propagation actually takes place with the speed of body sound. It could concern the same signals, which Prof. A. Popp calls biophotons and detects measuring technically in living organisms[<ii>]. He however considers the phenomenon for the same wavelength with the speed of light and lands at light frequencies, even then if nothing is glowing visibly! The question is asked: Does it concern the frequency of the light or only the corresponding wavelength or actually both, thus light, as is expressed in the name biophotons?
The photomultipliers, which Prof. Popp uses as „light amplifier", however can only be tuned to certain wavelengths and not to frequencies. Even if the detected biophotons have the wavelength of the light, then nevertheless nothing will glow if the velocity of propagation and as a result also the frequency differs from that of the light for several powers of ten. In the case of the immense number of cells also the number of photons should correspondingly sum up and the body as a whole should start to glow, which is not the case.

The waveguides in the intercellular matrix serving the cell communication, which Prof. H. Heine observes microscopically, have wavelengths between 20 and 300 nanometer, which corresponds to the range of the ultraviolet radiation[<iii>]. But if the propagation is slower than the light for 6 powers of ten, then also the frequency will only amount to one millionth and be situated into the range of the microwaves. Here a biological window seems to be present, to which we should turn our attention for reasons of the electromagnetic environmental compatibility!

The thermal radiation, which reaches the earth from the sun and the planets, lies in the microwave range between 2 and 20 cm. If the sun does well to us, if we need the radiation, then it could be because of the identical frequency. But that also means that the sun and the planets are capable to have an effect on the cell communication, that they for instance could function as clock for the heart.

<i>: H. Mayer, G. Winklbaur: Biostrahlen, Verlag ORAC, Wien 1989, 5. Auflage S. 97: Messung von der DNS eines Gurkenkeims abstrahlenden Photonen.

<ii>: A. Popp: Neue Horizonte in der Medizin, 2.Aufl. Haug Verlag Heidelberg 1987

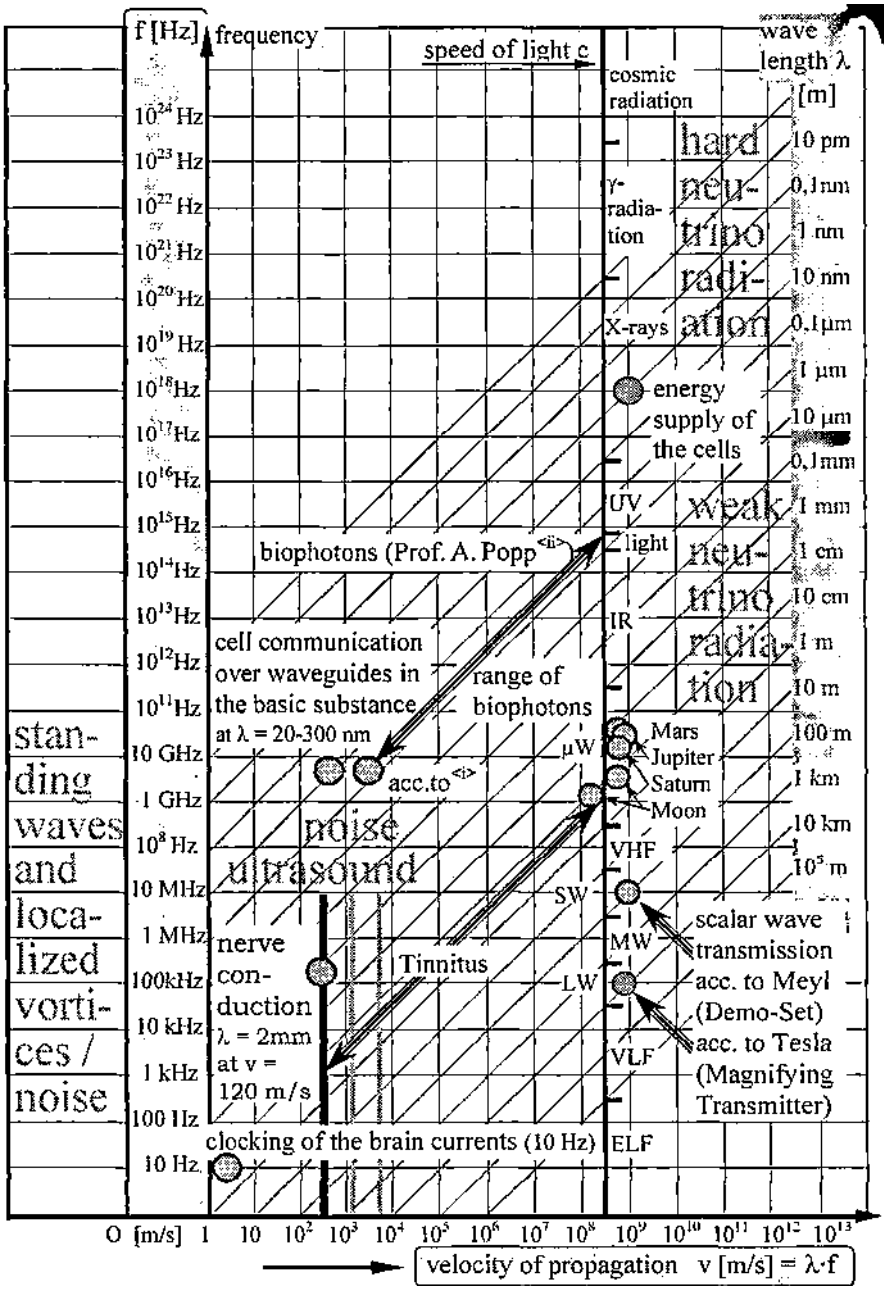


Fig. 25.8: Frequency diagram with entries concerning biologicallv
relevant areas (Tinnitus, nerve conduction, etc.).

25.8 Discussion concerning scalar wave medicine

In the sensitive range of the supposed microwaves window however are also situated the mobile phones and their harmonic waves, which occupy a broad spectrum in particular for pulsed operation in digital nets. The D-net for instance has a wavelength of 32 cm, the E-net lies at half that wavelength. But to which frequency does this correspond at the speed of sound? Now, the frequency is 6 powers of ten smaller and now lies at 1 kHz resp. 2 kHz. To that are added the numerous harmonic waves, which form a noise signal and lie above that. With that these signals are situated completely in the audible range, there where our ears are most sensitive!
This cause we probably owe the disease of modern civilization „Tinnitus". Every charged particle will follow this electromagnetic oscillation and produce corresponding sound oscillations, which can hear not „sick ", but completely on the contrary „healthy" people, who as a result possibly get sick. The objection, in this range also cosmic radiation for instance from the planets is present, is legitimate. It however should be considered that planets also are going away from the earth again and in addition is present a fluctuation according to the time of day due to the rotation of the earth, while the mobile telephone masts in our vicinity radiate in continuous operation.

In this window in addition the clocking of the brain currents takes place at 10 Hz. I would recommend blocking the acoustic relevant range between 2 cm (16 kHz) and 3 m wavelength (100 Hz) for all technical use. Every operation of a transmitter in a biological window harms all people and cannot be answered for by any institution.

It further should be considered that the biological window of the plants and animals as a rule correspond to that of man, but sometimes are shifted significantly upward or downward in wavelength. We are not entitled to judge nature. The immune system of the animals now obviously has reached the breaking point and also that of man doesn't seem to be that anymore, which it originally was.
We must proceed from the assumption that many diseases on the one hand and therapy methods on the other hand partly direct and partly indirect have to do something with scalar waves. (E.g. the occurring of cancer[<4i>]).

<i>: H. Mayer, G. Winklbaur: Biostrahlen, Verlag ORAC, Wien 1989, 5. Auflage, S. 97: Messung von der DNS eines Gurkenkeims abstrahlenden Photonen.

<ii>: A. Popp: Neue Horizonte in der Medizin, 2.Aufl. Haug Verlag Heidelberg 1987

<iii>: Hartmut. Heine: Lehrbuch der biologischen Medizin. Grundregulation und Extrazellulare Matrix, 2. Aufl. 1997, Hippokrates Verlag Stuttgart, S. 56

<4i>: K. Meyl: Skalarwellenstrahlung. Welche Bedeutung haben Skalarwellen fur die Medizin? GNP-Vortrag am 29.04.2001, Rhein-Main-Halle Wiesbaden, see: Co'med Fachzeitschrift fur Komplementarmedizin, 6/2001, pp.55-60.

I. According to the Maxwell theory:

1. Faraday's law of induction:

$$\text{rot}\,\mathbf{E} = -\,\delta\mathbf{B}/\delta t \quad (26.1)$$

with $E = E(r,t)$

and $H = H(r,t)$:

$$\mathbf{B} = \mu \cdot \mathbf{H} \quad (26.2)$$

$$-\,\text{rot rot}\,\mathbf{E} = \mu \cdot \delta(\text{rot}\,\mathbf{H})/\delta t \quad (26.3)$$

2. Ampere's law:

$$\text{rot}\,\mathbf{H} = \mathbf{j} + \delta\mathbf{D}/\delta t \quad (26.4)$$

with:

Ohm's law: $\mathbf{j} = \sigma \cdot \mathbf{E}$ (26.5)

dielectric displacement: $\mathbf{D} = \varepsilon \cdot \mathbf{E}$ (26.6)

relaxation time: $\tau = \varepsilon/\sigma$ (26.7)

$$\text{rot}\,\mathbf{H} = \varepsilon \cdot (\mathbf{E}/\tau + \delta\mathbf{E}/\delta t) \quad (26.8)$$

3. Inserting equation 26.8 into 26.3 yields:

$$-\,\text{rot rot}\,\mathbf{E} = \mu \cdot \varepsilon \cdot (1/\tau \cdot \delta\mathbf{E}/\delta t + \delta^2\mathbf{E}/\delta t^2) \quad (26.9)$$

with the abbreviation: $\mu \cdot \varepsilon = 1/c^2$ (26.10)

4. Field equation of a damped transverse wave:

$$\underbrace{-\,\text{rot rot}\,\mathbf{E} \cdot c^2}_{\text{transverse}} = \underbrace{\delta^2\mathbf{E}/\delta t^2}_{\text{wave}} + \underbrace{(1/\tau) \cdot \delta\mathbf{E}/\delta t}_{\text{vortex damping}} \quad (26.11)$$

Fig. 26.1: ____ Derivation of the wave damping by means of the formation of vortices![<i>]

<i>: see also EMC, part 1, chapter 5.3, 2.borderline case.

26. Recapitulation from the viewpoint of textbook physics

Now that we in the meantime have accumulated innumerable mosaic parts as inspiring contributions to the discussion for the information technical seminar, it is time to sort the ideas and to put the parts together to an overall picture.
Sceptics and orthodox scientists can only be convinced, if we start from textbook physics and completely do without postulates. Those demands will be fulfilled!

26.1 Common misinterpretation of the antenna losses

The mathematical description of physical relations leads to the well-known laws, which shouldn't be doubted anymore as soon as they are accepted to be correct. But what about the interpretation? Although a law dictates the interpretation and there is no choice, because laws must be adhered to, yet textbooks from time to time violate the mathematically dictated interpretation, a circumstance, which can't be accepted. I would like to illustrate this with an example.

Let us assume that the measured degree of effectiveness of a transmitting antenna amounts to 80 percent. There exist better antennas, but also distinctly worse antennas, but I'm not aiming at a certain construction. The statement simply says, that 80% of the fed in HF-power is transformed into Hertzian waves. Thus there arises a loss of power of 20 percent, and the question follows: of what do those 20% consist?

The answer, which is usual among experts and is supported by the textbooks, reads: the antenna wire gets hot and also the air around the antenna is heated by dielectric losses. In short, heat is formed.
But I have to point out and will furnish proof that this interpretation is predominantly wrong! It in any case isn't in accord with the laws of Maxwell. Who namely obeys the laws, comes to an entirely different result!

A short derivation brings it to light (fig. 26.1).
We start with the formulation of Faraday's law of induction according to the textbooks (26.1), apply the curl-operation to both sides of the equation (26.3) and insert in the place of rot H Ampere's law (26.4-26.8). The generally known result describes a damped electromagnetic wave (26.11)<◊>.
It on the one hand is a transverse wave, which represents 80% of the antenna power for our example. On the other hand a damping term can be found in the equation, which obviously corresponds to the sought-for 20%. With that the answer would have been found. We realize that because of a damping of the wave 20% antenna losses arise. These losses can't concern heat at all, since the damping term in the equation has got nothing in common with thermodynamics. In the equation doesn't stand anything about heat! Such a mistake!

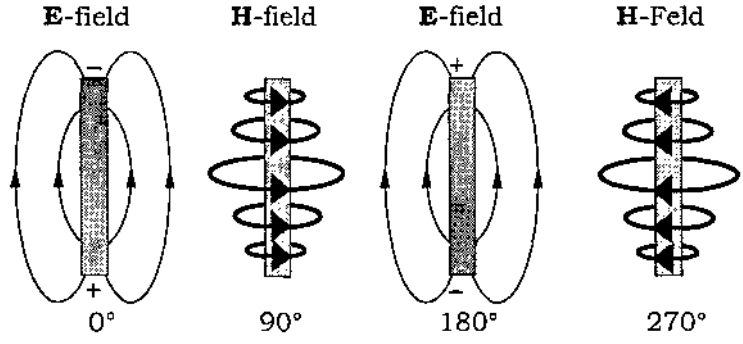


Fig. 21.8 A: The fields of the oscillating dipole antenna.<i>

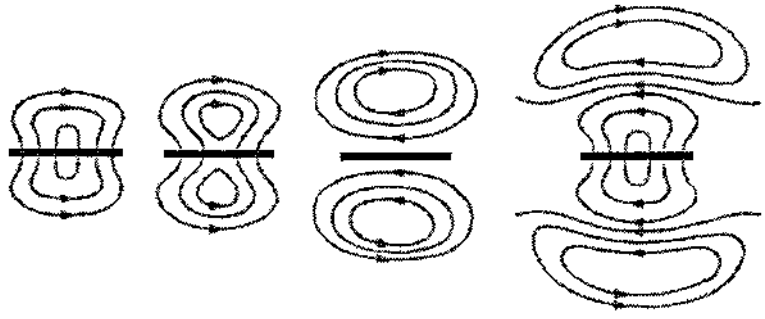


Fig. 21.9 A: The coming off of the electric field lines from the dipole.

<i>: Repetition belonging to chapter 21

26.2 Wave damping by field vortices

- Mathematically seen the damping term describes vortices of the electromagnetic field. This term for instance forms the basis of all eddy current calculations<ii>.
- Physically seen some waves - in our example it is 20 percent - roll up to field vortices, with which the wave damping and the antenna losses would be explained.

In the course of time a substantial part of the generated vortices will fall apart. These thereby will produce eddy losses in form of heat. Thus eventually still heat is produced - agreed. The criticism of the textbooks consists of the circumstance that we by no means can proceed from the assumption that all vortices spontaneously fall apart and a total conversion into heat will take place. The process in addition takes place with a temporal delay. The time constant x gives information in this respect. Field energy is buffered in the vortex, where some vortices live very long and it can't be ruled out that a few even exist as long as you like.

To find out more about these field vortices and their behaviour, one has to get deep into vortex physics. Unfortunately nothing can be found about vortex physics in the textbooks. The mistake is systematic. The following short compendium should help close the gap:

- Mathematically seen a closed-loop electromagnetic field vortex will show as a scalar. Such field vortices, which are mediated by a scalar field, are propagating exactly as charged particles in longitudinal manner as a scalar wave.
- Physically seen a closed-loop field vortex has got particle nature. If one particle kicks off the next one then an impulse is mediated, then a shock wave is occurring, a longitudinal undulation of the particles.

From the vortex physical view the interpretation of the antenna example now sounds entirely different:
The charge carriers in an antenna wire oscillating with high-frequency form a longitudinal shock wave. Between current and tension voltage usually a phase shift of 90° is present. The fields produced by these charge carriers form a scalar wave field in the immediate vicinity of the antenna, the so-called near-field zone, which likewise contains longitudinal field components and shows a phase shift of 90° between electric and magnetic field (fig. 21.8 A). As in textbooks is clarified by field lines, the generated fields actually form vortices, where one structure kicks off the next one (fig. 21.9 A).

The vortices in the near-field zone of an antenna consist of standing waves, which obviously are transforming with increasing distance. In our example 80% of these are unrolling and turn into transverse waves, whereby the characteristic phase angle between E- and H-field at that occasion becomes zero.
Let's turn again to those 20 percent loss.

<ii>: s.a.: K. Meyl: Wirbelstrome, Diss. Uni. Stuttgart 1984, INDEL Verlagsabt.

I. According to the Maxwell theory:

The consistent application of textbook physics

- Longitudinal waves run in the direction of a field pointer.
- The field pointer oscillates, the vector of velocity oscillates along!
- At relativistic velocities field vortices are subject to the Lorentz contraction.
- The faster the oscillating vortex is on its way, the smaller it gets.
- The vortex permanently changes its diameter (see fig. 21.10 B).
- With the diameter the wavelength decreases (see fig. 22.4).
- The swirl velocity is constant (= speed of light c).
- The eigenfrequency of the vortex oscillates with opposite phase to the wavelength.
- The vortex acts as a frequency converter!
- The measurable mixture of frequencies is called noise.

leads to the statement:

- The antenna noise corresponds to the antenna losses!

II. Mathematical description of a wave by the inhomogeneous Laplace equation:

$$\underbrace{\Delta \mathbf{E} \cdot c^2}_{\text{Laplace operator}} = \underbrace{-\,\text{rot rot}\,\mathbf{E} \cdot c^2}_{\text{transverse (radio wave)}} + \underbrace{\text{grad div}\,\mathbf{E} \cdot c^2}_{\text{longitudinal (scalar wave)}} = \underbrace{\delta^2\mathbf{E}/\delta t^2}_{\text{wave}} \qquad (26.12)$$

Divergence E is a scalar!
The corresponding term founds a scalar wave.

Fig. 26.3: Mathematical description of a wave according to Laplace.

26.3 Laplace versus Maxwell

Longitudinal waves as is well-known don't know a fixed velocity of propagation at all. Since they run in the direction of an oscillating field pointer also the vector of velocity will oscillate. For so-called relativistic velocities in the range of the speed of light c the field vortices are subject to the Lorentz contraction. That means, the faster the oscillating vortex is on its way, the smaller it gets. The vortex, as a mediator of a scalar wave carrying impulse, permanently changes its diameter.
Since, in the case of the vortices, it should concern rolled up waves, the vortex velocity will continue to be c, with which the wave now runs around the vortex centre in a circle. From that follows that if the diameter gets smaller, the wavelength of the vortex as well will decrease, whereas the eigenfrequency of the vortex accordingly increases. If the next moment the vortex oscillates back, the frequency again decreases. The vortex acts as a frequency converter! The mixture of high-frequency signals distributed over a broad frequency band formed in this way, is called noise. A noise signal indeed is measured from the outside with the help of broadband receivers.. We also speak of antenna noise and with this knowledge we can further specify the 20% antenna losses: The antenna produces 20 % noise, which can be put equal to the generated vortices because of the wave damping.

At this point the Maxwell theory doesn't leave us room for interpretation at all. If in the textbooks the impression is aroused, as if the noise were an independent discipline, than that is not true at all. How much the noise is connected with the electromagnetic waves, proves a short look at the wave equation.

The wave equation found in most textbooks has the form of an inhomogeneous Laplace equation. The famous French mathematician Laplace considerably earlier than Maxwell did find a comprehensive formulation of waves and formulated it mathematically (eq. 26.12), which until today is still accepted as valid.

On the one side of the wave equation the Laplace operator stands, which describes the spatial field distribution, and which according to the rules of vector analysis can be decomposed into two parts. On the other side the description of the time dependency of the wave can be found as an inhomogeneous term.

If the wave equation according to Laplace (26.12) is compared to the one, which the Maxwell equations have brought us (26.11), then two differences clearly come forward:

1. In the Laplace equation the damping term is missing. It doesn't describe the formation of vortices, and that means vortices do not exist at all, or present vortices have been there from the beginning.
2. With divergence E a scalar factor appears in the wave equation, which founds a scalar wave.

At this point at once hot tempered discussions concerning the question of the existence of scalar waves blaze up. But this question has already been answered clearly with the vortex consideration. Since an accepted description of longitudinal and scalar waves exists with the plasma wave and the plasma wave can be derived directly without postulate from the term of the wave equation (chapter 21.4/21.5), which founds scalar waves, there are further arguments present for their existence.

I. According to Maxwell:

$$\underbrace{-\,\mathrm{rot}\,\mathrm{rot}\,\mathbf{E}\cdot c^2}_{\text{transverse}} = \underbrace{\delta^2\mathbf{E}/\delta t^2}_{\text{wave}} + \underbrace{(1/\tau)\cdot\delta\mathbf{E}/\delta t}_{\text{vortex damping}} \qquad (26.11)$$

Description of electromagnetic waves with vortex damping
Example: sunlight and the damping in the ionosphere (bleu sky).

II. According to Laplace:

$$\underbrace{\Delta\mathbf{E}\cdot c^2}_{\text{Laplace operator}} = \underbrace{-\,\mathrm{rot}\,\mathrm{rot}\,\mathbf{E}\cdot c^2}_{\text{transverse (Hertz)}} + \underbrace{\mathrm{grad}\,\mathrm{div}\,\mathbf{E}\cdot c^2}_{\text{longitudinal (Tesla)}} = \underbrace{\delta^2\mathbf{E}/\delta t^2}_{\text{wave}} \qquad (26.12)$$

Description of transverse electromagnetic waves (Hertzian waves)
and longitudinal scalar waves (Tesla radiation).
1st example: propagation of light as a wave or as a particle.
2nd example: useful signal or noise signal of an antenna.

III. Mathematically seen (comparison of coefficients):

$$\underbrace{(1/\tau)\cdot\delta\mathbf{E}/\delta t}_{\text{vortex}} + \underbrace{\mathrm{grad}\,\mathrm{div}\,\mathbf{E}\cdot c^2}_{\text{scalar}} \approx 0 \qquad (26.13)$$

IV. Physically seen
(from the comparison of equation 26.12 with equation 26.11):

Vortices propagate longitudinally as a scalar wave!

Fig. 26.2: _____ Comparison of the two wave descriptions.

26.4 Error term in the wave equation

From the comparison of coefficients of both wave descriptions follows even more:

- Mathematically seen the damping - resp. vortex term according to Maxwell can be put equal to the scalar wave term according to Laplace.
- Physically seen the generated field vortices form and found a scalar wave.

Here also doesn't exist any room for interpretation, as long as we work with the wave equation according to Laplace and at the same time adhere to the Maxwell theory. If however the scalar wave part is put equal to zero, as is common practise in the textbooks, then as a consequence neither vortices nor noise may exist. But that contradicts all measuring technical experience! Since every antenna produces more or less noise, the textbooks obviously only show half the truth. Science however gropes for the whole truth and that should be fathomed.

If in the case of the antenna example the vortex part amounts to 20%, then that's tantamount to 20% scalar wave part, resp. 20% noise. The scalar wave part constitutes with regard to the Hertzian useful wave something like an error term in the wave equation. The part definitely is too big, as that it might be put equal to zero. Even so all error consideration in the textbooks is missing, if the scalar wave term is assumed to be zero. That violates all rules of physics and of taught scientific methodism.

In practice this shows by a useful signal going under in the noise and reception not being possible anymore as soon as the scalar wave part gets out of control. Even in this case, for which the degree of effectiveness tends towards zero, it still is common practise to put the error term, which is dominating everything, equal to zero. But who in this point follows the textbooks, disregards with that the wave equation and doing so by no means can refer to the circumstance that all colleagues make the same mistake.

The building of physics behaves like a house of cards, where the cards mutually support each other. Perhaps that is the deeper reason why those, who have discovered a marked card, don't pull it out immediately. In addition they are hindered by the self appointed guardians of the ,,pure doctrine", since everyone knows what happens with the house of cards if the marked card is pulled out. Only, do we want to and can we live with that in the long run? Is it a solution of the problem, if the so-called experts among the physicists and technicians look away and don't deal with the foundation of their branch anymore? If universities crash their basis education into the wall and choke off every contradiction?

Please allow me to pull out the marked card now and place it on the table!

It concerns the question: what is the nature of the field vortices, which form a scalar wave in space. Eddy currents in the iron parts of the antenna are explained with the field equations, but not the noise, which is measured especially in the air. If an antenna on the one hand produces field vortices and as a consequence eddy losses and on the other hand dielectric losses, then we can assume that besides the eddy currents in the conductor also vortices in the dielectric must exist. Let's search for them!

Interim result (comparison of arguments):

The Maxwell equations on the one hand dictate that as the reason for a wave damping only field vortices should be considered.	On the other hand the same laws merely describe eddy currents, which can only occur in the electrically conducting parts of the antenna.
On the one hand the field vortex interpretation makes it possible to explain the noise of an antenna perfectly.	On the other hand does the noise appear in the neighbourhood of the antenna, thus in the air and not in the iron parts!
The mathematical formulation reveals, how wave and vortex, resp. noise, co-operate and how one should imagine the conversion of one form into the other form.	In field physics on the other hand is missing a useful description of electric field vortices in a dielectric, which could found the noise signal.

Table 26.5: Arguments pro and contra.

26. 5 Interim result

It shouldn't be a disadvantage, to interprete physical laws more consistently than usual, even if in the present case orthodox science through that at first should fall into a deep crisis. If the way is worthwhile, only will show at the end.
Let us try to work out the contradictions in form of a comparison of arguments:

- The Maxwell equations on the one hand dictate that as the reason for a wave damping only field vortices should be considered.
  - On the other hand the same laws merely describe eddy currents, which can only occur in the electrically conducting parts of the antenna. .
- On the one hand the field vortex interpretation makes it possible to explain the noise of an antenna perfectly. .
  - On the other hand does the noise appear in the neighbourhood of the antenna, thus in the air and not in the iron parts!
- The mathematical formulation reveals, how wave and vortex, resp. noise, co-operate and how one should imagine the conversion of one form into the other form.
  - In field physics on the other hand is missing a useful description of electric field vortices in a dielectric, which could found the noise signal.

The most obvious among all conceivable solutions is the one that we have to assume the existence of dielectric field vortices, so-called potential vortices. We are challenged to search for a corresponding description. If the quest should be successful, then the contradictions would be overcome. In addition there is the promise of a whole number of simplifying explanations of various phenomena in the dielectric (see fig. 26.5 and fig. 26.7).

The phenomenon of noise becomes an aspect of wave physics, which is more than merely a field disturbance, which makes the reception of the useful wave more difficult. If the scalar wave nature is realized, then applications can be imagined, in which the noise is used as useful signal. In the way that the scalar part in the wave equation doesn't have to be put to zero anymore to obtain freedom of contradiction, even optimizations of antennas or of capacitors are possible with regard to the dielectric losses by means of the calculation of the scalar part.

New in any case is the idea that the dielectric losses of a capacitor are eddy losses and not a defect in material of the insulating material. With that the capacitor losses correspond to a generated noise power. We also can say, every capacitor more or less produces noise! The electric field lines point from one capacitor plate to the other plate. If one plate radiates as a transmitter and the other plate functions as a receiver, then the field propagation takes place in the direction of the electric field pointer and that again is the condition for a longitudinal wave. Here the circle closes in the conclusion, the capacitor field mediates dielectric field vortices, which following the field lines found a scalar wave because of their scalar nature. The heating of the capacitor results from the decay of vortices.

Potential vortices explain div. phenomena in the dielectric:

1. The **noise** no longer is factored out of the field theory.
2. The scalar (noise) part in the wave equation no longer has to be put to zero (div $\mathbf{E} \neq 0$).
3. The wave descriptions according to Maxwell (26.11) and according to Laplace (26.12) are consistent and free of contradiction.
4. The dielectric losses of an antenna can be found physically and even can be calculated with the wave equation.
5. **Also the dielectric losses** of a capacitor are **eddy losses** (and not a defect in material of the insulating material).
6. The **capacitor losses** correspond to a generated **noise power.**
7. The **dielectric constant** ε doesn't have to be written down complex as until now to give reasons for the occurring losses, and so the inner contradiction is solved, which is hidden in a complex constant. One should only remember the definition of the speed of light $c = 1/\sqrt{\varepsilon\mu}$ (eq. 26.10) and the insurmountable problems in the textbooks, which are brought by a complex ε!
8. The field lines point from one capacitor plate to the other plate. If one plate radiates as a transmitter and the other plate functions as a receiver, then the field propagation takes place in the direction of the electric field pointer and that again is the condition for a **longitudinal wave.**
9. The capacitor field mediates dielectric field vortices, which following the field lines found a **scalar wave** because of their scalar nature.
10. As an inhabitant of a dielectric between two capacitor plates (earth and ionosphere) also **man** is a product of these field vortices.
11. Scalar waves can be modulated moredimensionally and be used as **carrier of information,** as Prof. Sheldrake has proven with his proof of the existence of morphogenetic fields <i>.

Fig. 26.6: ____ Advantages of a field description extended with potential vortices.

<i>: Rupert Sheldrake: Seven Experiments That Could Change the World. Riverhead Books, 1995

26.6 Failure of the Maxwell theory

If the capacitor losses or the antenna noise should concern dielectric losses in the sense of vortex decay of potential vortices, which don't occur in the Maxwell theory at all, then we are confronted with a massive contradiction:

- For the description of the losses the Maxwell; theory on the one hand only offers field vortices and those only in the conductive medium.
  - On the other hand do the dielectric losses occut in the nonconductor and in the air.

- In conductive materials vortex fields occur, in the insulator however the fields are irrotational. That isn't possible, since at the transition from the conductor to the insulator the laws of refraction are valid and these require continuity! Hence a failure of the Maxwell theory (Fig. 26.7) will occur in the dielectric.
  - As a consequence the existence of vortex fields in the dielectric, so-called potential vortices, should be required!

In electrodynamics as a help the approach of a vector potential A is used, which leads to a complex formulation of the dielectric constant ε and in this way makes it possible, to mathematically describe the dielectric losses of a capacitor by means of the load angle, which stretches in the complex plane. But which physical value does this approach have? How can now the inner contradiction be explained, which is hidden in a complex constant of material? One should only remember the definition of the speed of light $c = 1/\sqrt{\varepsilon\mu}$ (eq. 26.10) and its dependency of ε. For a complex ε here are resulting insurmountable problems in the textbooks.
From the viewpoint of mathematics the introduction of the vector potential at first may represent a help. The before mentioned contradictions however fast raise doubts to the model concept, which from a physical viewpoint eventually will lead to errors, if the speed of light isn't constant anymore and even should be complex.

These considerations should be sufficient as a motive to require potential vortices, even if for their description the field theory according to the textbooks has to be revised. As a supplement there is pointed to the following points:

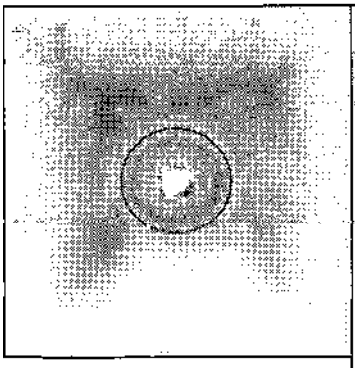
- As an inhabitant of a dielectric between two capacitor plates also man is a product of these field vortices.
- Scalar waves can be modulated moredimensionally and be used as carrier of information, as Prof. Sheldrake has proven with his proof of morphogenetic fields<i>.

The dielectric vortices moreover provide an explanation for natural events. They form the key to numerous disciplines of science, from physics over biology up to medicine.

<i>: Rupert Sheldrake: Seven Experiments That Could Change the World. Riverhead Books, 1995

Problem of continuity in the case of the coming off of vortices

Example: hightension cable



In ***conductive materials*** ***vortex fields*** *occur in the* ***insulator*** *however the fields are* ***irrotational.***
That isn't possible, since at the transition from the conductor to the insulator the ***laws of refraction*** *are valid and these require* ***continuity!***
Hence a ***failure of the Maxwell theory*** *will occur in the dielectric!*

Conclusion: ♦ According to the Maxwell theory there exist no vortices of the electric field *(no potential vortices)* and therefore *no scalar waves.*

♦ Without theory it is impossible to design a usable *scalar wave gauge* and to furnish *evidence*. ⇒ **Classic closed loop conclusion:**

♦ The missing of scientific evidence again „proves" the assumption of the irrotationality and „confirms" the correctness of the Maxwell theory.

♦ Hence it cannot be, what shouldn't be!

Fie. 26.7: Concerning the failure of the Maxwell theory

26.7. Concerning the evidence situation

In the question, if a physical phenomenon should be acknowledged as such, experimental, mathematical and physical evidence should be shown. In the case of the potential vortices, the vortices of the electric field and their propagation as a scalar wave, the historical experiments of Nikola Tesla[<i>] and the modern clone of these can be judged as experimental evidence[<ii>].

With the well-known wave equation a mathematical description for this phenomenon has been specified and discussed[<iii>]. It will be shown that both transverse and longitudinal wave parts are contained alongside in the wave equation, i.e. both radio waves according to Hertz and scalar waves according to Tesla. Doing so the mathematically determined scalar wave properties are identical with the experimental results!
The wave equation is an inhomogeneous Laplace equation and the first and oldest description of scalar waves. It thereby is unimportant, if the famous mathematician Laplace himself already may have realized and discussed this circumstance or not. The description fits perfectly and that is what counts!

At this point the third point should be put on the agenda, the physical evidence. This is connected very closely with the question for a suitable field theory and that again is basing on a corresponding approach.

<i>: N. Tesla: Apparatus for Transmission of Electrical Energy, US-Patent-No.: 649,621, New York 1900, Dr. Nikola Tesla: Complete Patents pp318-321.

<ii>: Johannes von Buttlar im Gesprach mit Prof. Dr. Konstantin Meyl: Neutrinopower, Argo-Verlag, Marktoberdorf, l.Aufl. 2000.

<iii>: K. Meyl: Scalar Waves: Theory and Experiments, Journal of Scientific Exploration, Vol. 15, No. 2, pp. 199-205, 2001

(* * * Task Schedule * * *)

1. Neutrino radiation => energy radiation!
   (acc. to Pauli: ν cares for missing energy in the case of the ß-decay)
2. High neutrino density => high energy density!
   3. Neutrino = particle without charge or mass (mean), but because of oscillations: effective value of charge and mass ≠ zero!
   4. Interaction only in the case of resonance (e.g. weak interaction)!
   (same frequency, 180° phase shift)
   5. Neutrino radiation is an energy source which can be used (not a question of physics, only a question of technology!)
6. Particle radiation (neutrino) => shock wave (like sound)
   => longitudinal wave
   => scalar wave (mathem.)
7. Interaction/resonance of the v = scalar wave problem
8. Scalar waves are a problem of the field theory!
9. Maxwell theory neglects scalar waves.

- Search for a new approach (chap. 27.8)
- Derivation of the Maxwell equations as a
- Derivation of scalar waves (chap. 27.13)
- Derivation of the gravitation and more

Table 27.1: Task schedule belonging to chapter 27

27. Faraday versus Maxwell

Numerous phenomena of the electromagnetic field are described sufficiently accurate by the Maxwell equations, so that these as a rule are regarded as a universal field description. But if one looks more exact it turns out to be purely an approximation, which in addition leads to far reaching physical and technological consequences. We must ask ourselves:

- What is the Maxwell approximation?
- How could a new and extended approach look like?
  - Faraday instead of Maxwell, which is the more general law of induction?
- Can the Maxwell equations be derived as a special case?
- Can also scalar waves be derived from the new approach?
- Can the gravitation as well be derived and a lot else more?

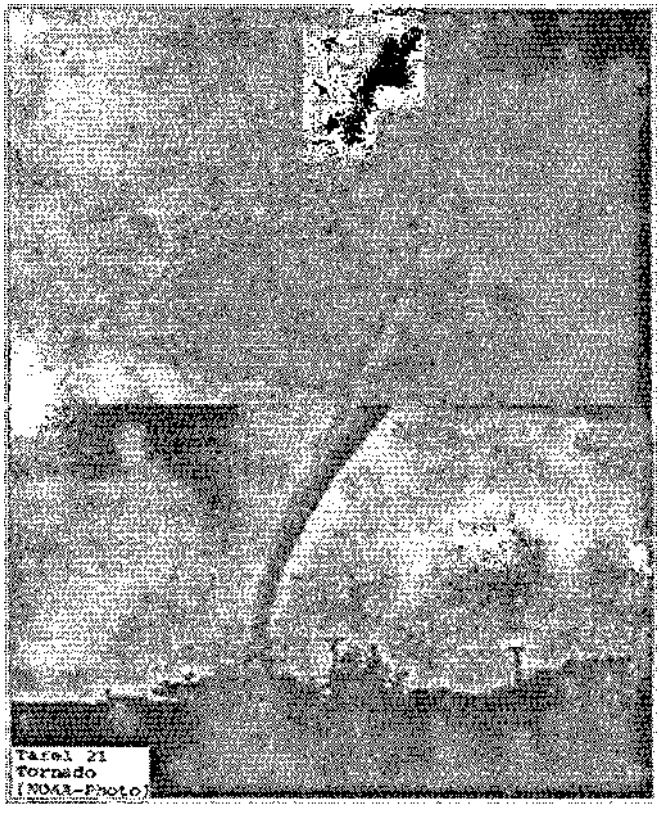
On the one hand it concerns the big search for a unified physical theory and on the other hand the chances of new technologies, which are connected with an extended field theory. As a necessary consequence of the derivation, which roots strictly in textbook physics and manages without postulate, scalar waves occur, which could be used manifold. In information technology they are suited as a carrier wave, which can be modulated moredimensionally, and in power engineering the spectrum stretches from the wireless transmission up to the collection of energy out of the field.

27.1 Energy out of the field

Neutrinos for instance are such field configurations, which move through space as a scalar wave. They were introduced by Pauli as massless but energy carrying particles to be able to fulfil the balance sheet of energy for the beta decay. Nothing would be more obvious than to technically use the neutrino radiation as an energy source.
But for a technical exploitation a useful model description of the particles and their interaction is imperative. For the sake of simplicity we imagine the neutrino to be an oscillating particle, which permanently oscillates back and forth between the state of an electron and that of a positron. With that the polarity changes from positive to negative and back again and the charge averaged over time is zero. Because of the change from a state of matter to the state of an anti-particle also next to no mass can be measured anymore.
A technical oscillator operated in resonance, which oscillates with the same frequency but opposite charge, will interact with the particle and build up an oscillating electromagnetic interaction, with which we already are familiar as the weak interaction in the proximity of a neutrino.

Tubular vortices

• Examples: drain vortex (bathtub vortex)
whirlwind and waterspout, tornado (image).



Inside: expanding vortex
Outside: contracting anti-vortex
Condition for coming off: equally powerful vortices
Criterion: viscosity
Result: tubular structure

Fig. 27.2: ____ Vortex and anti-vortex - a physical basic principle

<i>: Lugt: Wirbelstromung in Natur und Technik, G. Braun Verlag Karlsruhe 1979, Bild „Tornado" von Tafel 21, Seite 356

The propagation of particle radiation as a longitudinal shock wave however can't be described with the normally used field theory and the Maxwell equations, so that the field theory at this point must be reworked. Connected with this is the question of what is oscillating here, a question, which often is answered with an aether of whatever nature. I speak of field vortices and call the aether a property of the field. With that the set of difficulties is shifted into the domain of vortex physics.

27.2 Vortex and anti-vortex

In the eye of a tornado the same calm prevails as at great distance, because here a vortex and its anti-vortex work against each other. In the inside the expanding vortex is located and on the outside the contracting anti-vortex. One vortex is the condition for the existence of the other one and vice versa. Already Leonardo da Vinci knew both vortices and has described the dual manifestations (chapter 3.4).

In the case of flow vortices the viscosity determines the diameter of the vortex tube where the coming off will occur. If for instance a tornado soaks itself with water above the open ocean, then the contracting potential vortex is predominant and the energy density increases threateningly. If it however runs overland and rains out, it again becomes bigger and less dangerous.

The conditions for the bathtub vortex are similar. Here the expanding vortex consists of air, the contracting vortex however of water. In flow dynamics the relations are understood. They mostly can be seen well and observed without further aids.

In electrical engineering it's different: here field vortices remain invisible and not understood. Only so the Maxwell theory could find acceptance, although it only describes mathematically the expanding eddy current and ignores its anti-vortex. I call the contracting anti-vortex potential vortex" and point to the circumstance, that every eddy current entails the anti-vortex as a physical necessity.
Because the size of the forming structures is determined by the electric conductivity, in conducting materials the vortex rings, being composed of both vortices, are huge, whereas they can contract down to atomic dimensions in nonconductors. Only in semiconducting and resistive materials the structures occasionally can be observed directly (fig. 4.8).

Spherical vortices

Examples:	expanding vortex	contracting vortex
• quantum physics	collision processes (several quarks)	gluons (postulate!)
• nuclear physics	repulsion of like	strong interaction (postulate!)
• atomic physics	centrifugal force of the enveloping electrons	electrical attraction Schrodinger equation
• astro-physics	centrifugal force (inertia)	gravitation (can not be derived?!)

Example: elementary particles as electromagnetic field vortices

Inside:	expanding eddy current (skin effect)
Outside:	contracting anti-vortex (potential vortex)
Condition	for coming off: equally powerful vortices
Criterion:	electric conductivity (determines diameter)
Result:	spherical structure (consequence of the pressure of the vacuum)

Fig. 27.3: Spherical structures as a result of contracting potential vortices.<i>

Demokrit (460-370 BC) equated the vortex concept with „law of nature"! – the first attempt to formulate a unified physics.

<i>: see Part 1, chapter 4.3

27.3 Vortices in the microcosm and macrocosm

The approximation, which is hidden in the Maxwell equations, thus consists of neglecting the anti-vortex dual to the eddy current. It is possible that this approximation is allowed, as long as it only concerns processes inside conducting materials. If we however get to insulating materials the Maxwell approximation will lead to considerable errors and it won't be able to keep it anymore.

If we take as an example the lightning and ask how the lightning channel is formed: Which mechanism is behind it, if the electrically insulating air for a short time is becoming a conductor? From the viewpoint of vortex physics the answer is obvious: The potential vortex, which in the air is dominating, contracts very strong and doing so squezes all air charge carriers and air ions, which are responsible for the conductivity, together at a very small space to form a current channel.

The contracting potential vortex thus exerts a pressure and with that forms the vortex tube. Besides the cylindrical structure another structure can be expected. It is the sphere, which is the only form, which can withstand a powerful pressure if that acts equally from all directions of space. Only think of ball lightning. Actually the spherical structure is mostly found in microcosm till macrocosm. Let's consider some examples and thereby search for the expanding and contracting forces (fig. 27.2).

- In quantum physics one imagines the elementary particles to be consisting of quarks. Irrespective of the question, which physical reality should be attributed to this model concept, one thing remains puzzling: The quarks should run apart, or you should try to keep together three globules, which are moving violently and permanently hitting each other. For this reason glue particles were postulated, the so-called gluons, which now should take care for the reaction force, but this reaction force is nothing but a postulate!

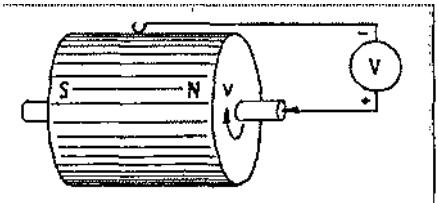
- In nuclear physics it concerns the force, which holds together the atomic nucleus, which is composed of many nucleons, and gives it the well-known great stability, although here like charged particles are close together. Particles, which usually repel each other. Between the theoretical model and practical reality there is an enormous gap, which should be overcome by introducing of a new reaction force. But also the nuclear force, called strong interaction, is nothing but a postulate!

- In atomic physics the electric force of attraction between the positive nuclear charge and the negatively charged enveloping electrons counteracts the centrifugal force. In this case the anti-vortex takes care for a certain structure of the atomic hull, which obey the Schrodinger equation as eigenvalue solutions. But also this equation irrespective of its efficiency until today purely is a mathematical postulate, as long as its origin is not clear.

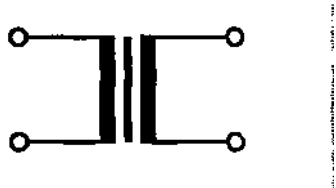
- In astrophysics centrifugal force (expansion) as a result of the inertia and gravitation (contraction) as a result of the attraction of masses are balanced. But the "gravitation" puts itself in the way of every attempt to formulate a unified field theory. Also this time it is the contracting vortex, of which is said it can't be derived nor integrated.

Michael Faraday,
the experimentor (1791-1867)

James Clerk Maxwell<i>,
the mathematician (1831-1879)



unipolar generator



e.g.: transformer

Fig. 27.4: ____ The fathers of the law of induction

<i>: J.C. Maxwell: A treatise on Electricity and Magnetism, Dover Publications

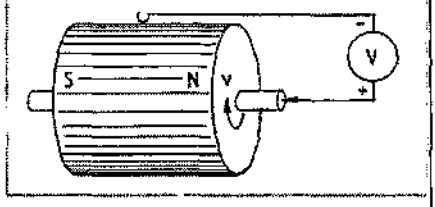
It is remarkable how in the domain of the contracting vortex the postulates are accumulating. But this hasn't always been the case. In ancient Greece already 2400 years ago Demokrit has undertaken an attempt to formulate a unified physics. He traced all visible and observable structures in nature back to vortices, each time formed of vortex and anti-vortex. This phenomenon appeared him to be so fundamental, that he put the term "vortex" equal to the term for „law of nature". The term „.atom" stems from Demokrit (460-370 BC).

Seen this way the physicists in ancient times already had been further than today's physics, which with the Maxwell approximation neglects the contracting vortex and with that excludes fundamental phenomena from the field description or is forced to replace them by model descriptions and numerous postulates.
What we need is a new field approach, which removes this flaw and in this point reaches over and above the Maxwell theory.

27.4 Faraday's law and Maxwell's formulation

In the choice of the approach the physicist is free, as long as the approach is reasonable and well founded. In the case of Maxwell's field equations two experimentally determined regularities served as basis: on the one hand Ampere's law and on the other hand the law of induction of Faraday. The mathematician Maxwell thereby gave the finishing touches for the formulations of both laws. He introduced the displacement current D and completed Ampere's law accordingly, and that without a chance of already at his time being able to measure and prove the measure. Only after his death this was possible experimentally, what afterwards makes clear the format of this man.
In the formulation of the law of induction Maxwell was completely free, because the discoverer Michael Faraday had done without specifications. As a man of practice and of experiment the mathematical notation was less important for Faraday. For him the attempts with which he could show his discovery of the induction to everybody, e.g. his unipolar generator, stood in the foreground.
His 40 years younger friend and professor of mathematics Maxwell however had something completely different in mind. He wanted to describe the light as an electromagnetic wave and doing so certainly the wave description of Laplace went through his mind, which needs a second time derivation of the field factor. Because Maxwell for this purpose needed two equations with each time a first derivation, he had to introduce the displacement current in Ampere's law and had to choose an appropriate notation for the formulation of the law of induction to get to the wave equation.
His light theory initially was very controversial. Maxwell faster found acknowledgement for bringing together the teachings of electricity and magnetism and the representation as something unified and belonging together[<1>] than for mathematically giving reasons for the principle discovered by Faraday.
Nevertheless the question should be asked, if Maxwell has found the suitable formulation, if he has understood 100 percent correct his friend Faraday and his discovery. If discovery (from 29.08.1831) and mathematical formulation (1862) stem from two different scientists, who in addition belong to different disciplines, misunderstandings are nothing unusual. It will be helpful to work out the differences.

Law of induction



unipolar generator

discovery of Faraday

$$\mathbf{E} = \mathbf{v} \times \mathbf{B} \qquad (27.1)$$

unipolar induction

e.g.: transformer

2nd Maxwell equation

$$\mathrm{rot}\,\mathbf{E} = -\,d\mathbf{B}/dt \qquad (27.1^*)$$

law of induction generally

Fig. 27.5: Two formulations for one law
As a mathematical relation between
the vectors of the electric field strength **E**
and the induction **B** (= magnetic flux density)

Consequences

(the physically mean of the „field concept"):

• The **Faraday approach** describes a field physical principle	• **Maxwell equations** describe the fields of charged particles
• field = experience: We experience the electric as a magnetic field and vice versa as a result of a relative velocity • Particles do not occur in the Faraday approach	• the electric (**E**-) field = static field of charges, • the magnetic (**H**-) field = field of moving charges. • The origin of the particles remains unsettled (postulate)
• Perfect duality between **E**- and **H**-field.	• No duality in the field description
• **v** leads to dual permutation of **E**- and **H**-field.	• Charge carriers=el. monopoles • No magnetic monopoles!

27.5 The discovery of Faraday

If one turns an axially polarized magnet or a copper disc situated in a magnetic field, then perpendicular to the direction of motion and perpendicular to the magnetic field pointer a pointer of the electric field will occur, which everywhere points axially to the outside. In the case of this by Faraday developed unipolar generator hence by means of a brush between the rotation axis and the circumference a tension voltage can be called off<i>. The mathematically correct relation E = v x B I call Faraday-law, even if it only appears in this form in the textbooks later in time<ii>. The formulation usually is attributed to the mathematician Hendrik Lorentz, since it appears in the Lorentz force in exactly this form. Much more important than the mathematical formalism however are the experimental results and the discovery by Michael Faraday, for which reason the law concerning unipolar induction is named after the discoverer.
Of course we must realize that the charge carriers at the time of the discovery hadn't been discovered yet and the field concept couldn't correspond to that of today. The field concept was an abstracter one, free of any quantization.

That of course also is valid for the field concept advocated by Maxwell, which we now contrast with the „Faraday-law" (fig. 27.4). The second Maxwell equation, the law of induction (27.1*), also is a mathematical description between the electric field strength E and the magnetic induction B. But this time the two aren't linked by a relative velocity v. In that place stands the time derivation of B, with which a change in flux is necessary for an electric field strength to occur. As a consequence the Maxwell equation doesn't provide a result in the static or quasi-stationary case, for which reason it in such cases is usual, to fall back upon the unipolar induction according to Faraday (e.g. in the case of the Hall-probe, the picture tube, etc.). The falling back should only remain restricted to such cases, so the normally used idea. But with which right the restriction of the Faraday-law to stationary processes is made?
The vectors E and B can be subject to both spatial and temporal fluctuations. In that way the two formulations suddenly are in competition with each other and we are asked, to explain the difference, as far as such a difference should be present.

<i>: Part 2, INDEL 1996, Chap. 16.1

<ii>: among others in R.W. Pohl: Einfuhrung in die Physik, Bd.2 Elektrizitatslehre, 21.Aufl. Springer-Verlag 1975, Seite 76 und 130

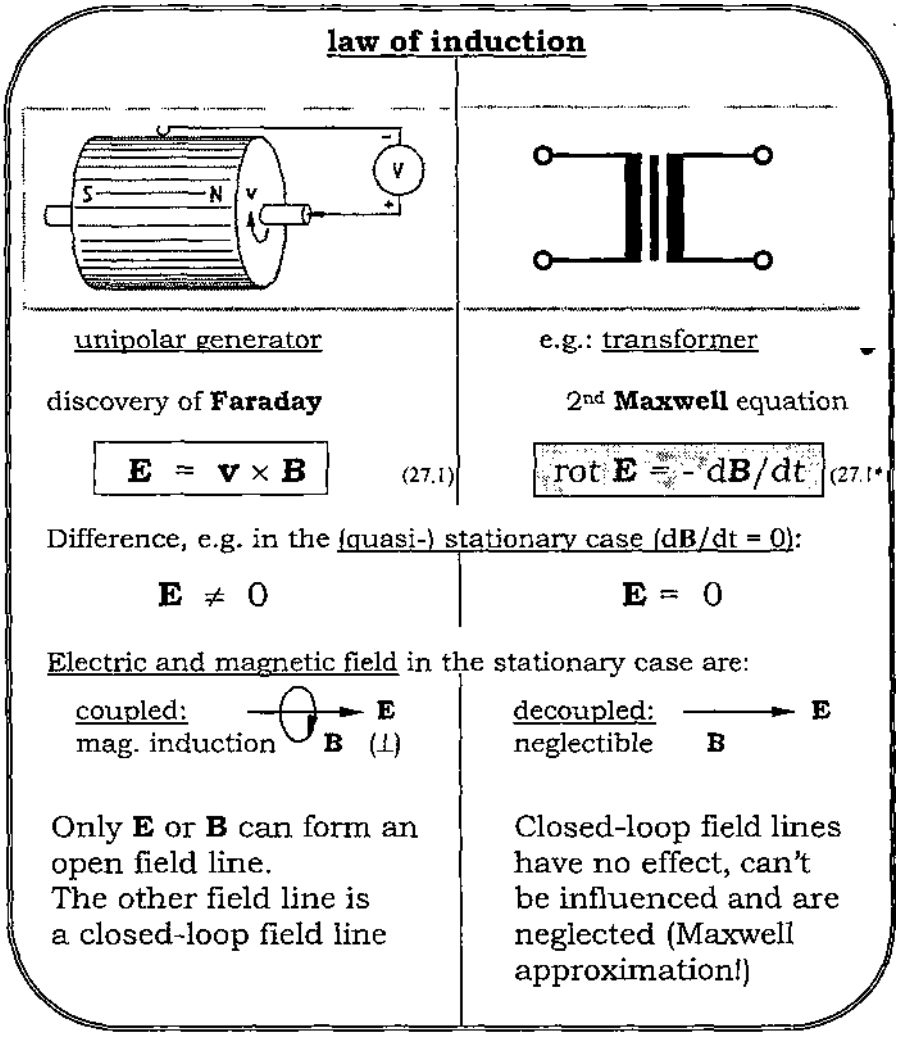


Fig. 27.6: ____Law of induction according to Faraday or Maxwell?

27.6 Different formulation of the law of induction

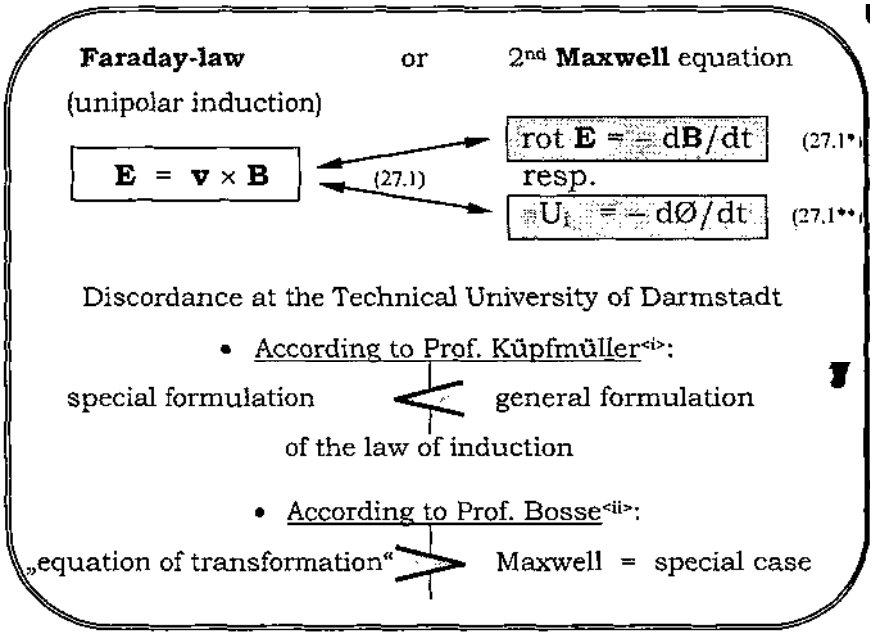
Such a difference for instance is, that it is common practice to neglect the coupling between the fields at low frequencies. While at high frequencies in the range of the electromagnetic field the E- and the H-field are mutually dependent, at lower frequency and small field change the process of induction drops correspondingly according to Maxwell, so that a neglect seems to be allowed. Now electric or magnetic field can be measured independently of each other. Usually is proceeded as if the other field is not present at all.

That is not correct. A look at the Faraday-law immediately shows that even down to frequency zero always both fields are present. The field pointers however stand perpendicular to each other, so that the magnetic field pointer wraps around the pointer of the electric field in the form of a vortex ring in the case that the electric field strength is being measured and vice versa. The closed-loop field lines are acting neutral to the outside; they hence need no attention, so the normally used idea. It should be examined more closely if this is sufficient as an explanation for the neglect of the not measurable closed-loop field lines, or if not after all an effect arises from fields, which are present in reality.

Another difference concerns the commutability of E- and H-field, as is shown by the Faraday-generator, how a magnetic becomes an electric field and vice versa as a result of a relative velocity v. This directly influences the physical-philosophic question: What is meant by the electromagnetic field?

The textbook opinion based on the Maxwell equations names the static field of the charge carriers as cause for the electric field, whereas moving ones cause the magnetic field. But that hardly can have been the idea of Faraday, to whom the existence of charge carriers was completely unknown. The for his contemporaries completely revolutionary abstract field concept based on the works of the Croatian Jesuit priest Boscovich (1711-1778). In the case of the field it should less concern a physical quantity in the usual sense, than rather the experimental experience"' of an interaction according to his field description. We should interprete the Faraday-law to the effect that we experience an electric field, if we are moving with regard to a magnetic field with a relative velocity and vice versa.

In the commutability of electric and magnetic field a duality between the two is expressed, which in the Maxwell formulation is lost, as soon as charge carriers are brought into play. Is thus the Maxwell field the special case of a particle free field? Much evidence points to it, because after all a light ray can run through a particle free vacuum. If however fields can exist without particles, particles without fields however are impossible, then the field should have been there first as the cause for the particles. Then the Faraday description should form the basis, from which all other regularities can be derived. What do the textbooks say to that?



Different order in the derivation

- Acc. to the TU Darmstadt (Prof. Küpfmüller<i>/Prof. Bosse<ii>)

follows from F = Q · E
and F = Q · (v x B)
→ E = v x B
unipolar induction can be derived !

- According to the University of Göttingen (Prof. Pohl<iii>)

follows from F = Q · E
and E = v x B
→ F = Q · (v x B)
Lorentz force can be derived !

Fig. 27.7: Different opinions and derivations

<i>: K. Kupfmuller: Einfuhrung in die theoretische Elektrotechnik, 12. Auflage, Springer Verlag 1988, Seite 228, Gl. 22.

<ii>: G. Bosse: Grundlagen der Elektrotechnik II, BI-Hochschultaschenbucher Nr. 183, l.Aufl. 1967, Kap. 6.1 Induktion, Seite 58

<iii>: R. W. Pohl: Einfuhrung in die Physik, Band 2 Elektrizitatslehre, 21. Auflage, Springer-Verlag 1975, Seite 77

27.7 Contradictory opinions in textbooks

Obviously there exist two formulations for the law of induction (27.1 and 27.1*), which more or less have equal rights. Science stands for the question: which mathematical description is the more efficient one? If one case is a special case of the other case, which description then is the more universal one?

What Maxwell's field equations tell us is sufficiently known, so that derivations are unnecessary. Numerous textbooks are standing by, if results should be cited. Let us hence turn to the Faraday-law (27.1). Often one searches in vain for this law in schoolbooks. Only in more pretentious books one makes a find under the keyword "unipolar induction". If one however compares the number of pages, which are spent on the law of induction according to Maxwell with the few pages for the unipolar induction, then one gets the impression that the latter only is a unimportant special case for low frequencies. Kupfmuller speaks of a „special form of the law of induction"<i>, and cites as practical examples the induction in a brake disc and the Hall-effect. Afterwards Kupfmiiller derives from the „special form" the „general form" of the law of induction according to Maxwell, a postulated generalization, which needs an explanation. But a reason is not given<i>. Bosse gives the same derivation, but for him the Maxwell-result is the special case and not his Faraday approach<ii>! In addition he addresses the Faraday-law as equation of transformation and points out the meaning and the special interpretation. On the other hand he derives the law from the Lorentz force, completely in the style of Kupfmuller<i> and with that again takes it part of its autonomy. Pohl looks at that different. He inversely derives the Lorentz force from the Faraday-law<iii>.

By all means, the Faraday-law, which we want to base on instead of on the Maxwell equations, shows „strange effects<i4>" from the point of view of a Maxwell representative of today and thereby but one side of the medal (eq. 27.1). Only in very few distinguished textbooks the other side of the medal (eq. 27.2) is mentioned at all. In that way most textbooks mediate a lopsided and incomplete picture<i,ii,i4>. If there should be talk about equations of transformation, then the dual formulation belongs to it, then it concerns a pair of equations, which describes the relations between the electric and the magnetic field.

If the by Bosse<ii> prompted term „equation of transformation" is justified or not at first is unimportant. That is a matter of discussion.

<i>: K. Kupfmuller: Einfuhrung in die theoretische Elektrotechnik, 12.Aufl., Springer Verlag 1988, Seite 228, Gl. 22.

<ii>: G. Bosse: Grundlagen der Elektrotechnik II, BI-Hochschultaschenbucher Nr.183, l.Aufl. 1967, Kap. 6.1 Induktion, Seite 58

<iii>: R.W.Pohl: Einfuhrung in die Physik, Bd.2 Elektrizitatslehre, 2 l.Aufl. Springer-Verlag 1975, Seite 77

<i4>: G. Lehner: Elektromagnetische Feldtheorie, Springer-Lehrbuch 1990, 1. Aufl., Seite 31 Kommentar zur Lorentzkraft (1.65)

The new and dual field approach consists of equations of transformation

of the electric and of the magnetic field[i]

$\mathbf{E} = \mathbf{v} \times \mathbf{B}$ (27.1) and $\mathbf{H} = -\mathbf{v} \times \mathbf{D}$ (27.2)

unipolar induction equation of convection

- Formulation according to the rules of duality
  - Grimsehl[ii] speaks of the ,,equation of convection", according to which moving charges produce a magnetic field and so-called convection currents (referring to Rontgen 1885, Himstedt, Rowland 1876, Eichenwald and others)
- Pohl[iii] gives examples for the equations of transformation,
- he writes the equations beneath each other

$\mathbf{E} = \mu \cdot \mathbf{v} \times \mathbf{H}$ (27.3) and $\mathbf{H} = -\varepsilon \cdot \mathbf{v} \times \mathbf{E}$ (27.4)

- and points out that for $v = c = 1/\sqrt{\mu \cdot \varepsilon}$ one equation changes into the other one!

The new and dual approach roots in textbook physics!

Fig. 27.8: The new and dual field approach

<i>: see Part 1, chapter 6.5

<ii>: Grimsehl: Lehrbuch der Physik, 2.Bd., 17,Aufl. Teubner Verl. 1967, S. 130.

<iii>: R.W.Pohl: Einfuhrung in die Physik, Bd.2 Elektrizitatslehre, 21.Aufl. Springer-Verlag 1975, Seite 77

27.8 The field-theoretical approach

The duality between E- and H-field and the commutability asks for a corresponding dual formulation to the Faraday-law (27.1). Written down according to the rules of duality there results an equation (27.2), which occasionally is mentioned in some textbooks. While both equations in the books of Pohl[<i>] and of Simonyi[<ii>] are written down side by side having equal rights and are compared with each other, Grimsehl[<iii>] derives the dual regularity (27.2) with the help of the example of a thin, positively charged and rotating metal ring. He speaks of „equation of convection", according to which moving charges produce a magnetic field and so-called convection currents. Doing so he refers to workings of Rontgen 1885, Himstedt, Rowland 1876, Eichenwald and many others more, which today hardly are known.
In his textbook also Pohl gives practical examples for both equations of transformation. He points out that one equation changes into the other one, if as a relative velocity v the speed of light c should occur. This question will also occupy us.

We now have found a field-theoretical approach with the equations of transformation, which in its dual formulation is clearly distinguished from the Maxwell approach. The reassuring conclusion is added: The new field approach roots entirely in textbook physics, as are the results from the literature research. We can completely do without postulates.
Next thing to do is to test the approach strictly mathematical for freedom of contradictions. It in particular concerns the question, which known regularities can be derived under which conditions. Moreover the conditions and the scopes of the derived theories should result correctly, e.g. of what the Maxwell approximation consists and why the Maxwell equations describe only a special case.

27.9 Derivation of Maxwell's field equations

As a starting-point and as approach serve the equations of transformation of the electromagnetic field, the Faraday-law of unipolar induction and the according to the rules of duality formulated law (eq. 27.1, 2). If we apply the curl to both sides of the equations then according to known algorithms of vector analysis the curl of the cross product each time delivers the sum of four single terms. Two of these again are zero for a non-accelerated relative motion in the x-direction with v = dr/dt.
One term concerns the vector gradient (v grad)B, which can be represented as a tensor. By writing down and solving the accompanying derivative matrix giving consideration to the above determination of the v-vector, the vector gradient becomes the simple time derivation of the field vector B(r(t)) (eq. 27.10, according to the rule of eq. 27.11).

<i>: R.W.Pohl: Einfuhrung in die Physik, Bd.2 Elektrizitatslehre, 21.Aufl. Springer-Verlag 1975, Seite 76 und 130

<ii>: K. Simonyi: Theoretische Elektrotechnik, 7.Aufl. VEB Berlin 1979, Seite 924.

<iii>: Grimsehl: Lehrbuch der Physik, 2,Bd., 17.Aufl. Teubner Verl. 1967, S. 130.

As approach serve the equations of transformation (fig. 27.5) of the electric and of the magnetic field:

$$\mathbf{E} = \mathbf{v} \times \mathbf{B} \quad (27.1) \text{ and } \quad \mathbf{H} = -\mathbf{v} \times \mathbf{D} \quad (27.2)$$

If we apply the curl to the respective cross product:

$$\text{rot}\,\mathbf{E} = \text{rot}\,(\mathbf{v} \times \mathbf{B}) \quad (27.5) \text{ and } \quad \text{rot}\,\mathbf{H} = -\,\text{rot}\,(\mathbf{v} \times \mathbf{D}) \quad (27.6)$$

then according to the algorithms<i> four sum terms are delivered:

$$\text{rot}\,\mathbf{E} = (\mathbf{B}\,\text{grad})\mathbf{v} - (\mathbf{v}\,\text{grad})\mathbf{B} + \mathbf{v}\,\text{div}\,\mathbf{B} - \mathbf{B}\,\text{div}\,\mathbf{v} \quad (27.5)$$

$$\text{rot}\,\mathbf{H} = -[(\mathbf{D}\,\text{grad})\mathbf{v} - (\mathbf{v}\,\text{grad})\mathbf{D} + \mathbf{v}\,\text{div}\,\mathbf{D} - \mathbf{D}\,\text{div}\,\mathbf{v}] \quad (27.6)$$

where 2 of them are zero because of: $\mathbf{v}(t) = d\mathbf{r}/dt$ (27.7)

- the divergence of v(t) disappears: $\text{div}\,\mathbf{v} = 0$, (27.8)
- and will be zero as well: $\partial\mathbf{v}(t)/\partial\mathbf{r} = \text{grad}\,\mathbf{v} = \mathbf{0}$. (27.9)
- there remain the vector gradients:

$$(\mathbf{v}\,\text{grad})\,\mathbf{B} = \frac{d\mathbf{B}}{dt} \text{ and } (\mathbf{v}\,\text{grad})\,\mathbf{D} = \frac{d\mathbf{D}}{dt} \quad ,(27.10)$$

- according to the rules<i> in general (with eq. 27.7):

$$\frac{d\mathbf{V}(\mathbf{r}(t))}{dt} = \frac{\partial\mathbf{V}(\mathbf{r}=\mathbf{r}(t))}{\partial\mathbf{r}} \cdot \frac{d\mathbf{r}(t)}{dt} = (\mathbf{v}\,\text{grad})\,\mathbf{V} \quad (27.11)$$

- A comparison of the coefficients of both field equations

$$\text{rot}\,\mathbf{E} = -\,d\mathbf{B}/dt + \mathbf{v}\,\text{div}\,\mathbf{B} = -\,d\mathbf{B}/dt - \mathbf{b} \quad (27.12)$$

$$\text{rot}\,\mathbf{H} = d\mathbf{D}/dt - \mathbf{v}\,\text{div}\,\mathbf{D} = d\mathbf{D}/dt + \mathbf{j} \quad (27.13)$$

with the Maxwell equations results in:

- for the potential density $b = -\,v\,\text{div}\,B = 0$, (27.14)
  (eq. 27.12 = law of induction, if b = 0 resp. div B = 0)
- for the current density $j = -\,v\,\text{div}\,D = -\,v_x \cdot \rho_{el}$, (27.1a
  (eq. 27.13 = Ampere's law, if j = with v moving negative charge carriers (ρ_{el}= electric space charge density).

Fig. 27.9: ___ Derivation of Maxwell's field equations as a special case of the equations of transformation

<i>: Bronstein u.a.: Taschenbuch der Mathematik, 4.Neuaufl. Thun 1999, S. 652

For the last not yet explained terms at first are written down the vectors b and j as abbreviation. With equation 27.13 we in this way immediately look at the well-known law of Ampere (1st Maxwell equation). The comparison of coefficients (27.15) in addition delivers a useful explanation to the question, what is meant by the current density j: it is a space charge density ρ_{el} consisting of negative charge carriers, which moves with the velocity v for instance through a conductor (in the x-direction).
The current density j and the to that dual potential density b mathematically seen at first are nothing but alternative vectors for an abbreviated notation. While for the current density j the physical meaning already could be clarified from the comparison with the law of Ampere, the interpretation of the potential density b still is due. From the comparison with the law of induction (eq. 27.1*) we merely infer, that according to the Maxwell theory this term is assumed to be zero. But that is exactly the Maxwell approximation and the restriction with regard to the new and dual field approach, which roots in Faraday.
In that way also the duality gets lost with the argument that magnetic monopoles (div B) in contrast to electric monopoles (div D) do not exist and until today could evade every proof. It thus is overlooked that div D at first describes only eddy currents and div B only the necessary anti-vortex, the potential vortex. Spherical particles, like e.g. charge carriers presuppose both vortices: on the inside the expanding (div D) and on the outside the contracting vortex (div B), which then necessarily has to be different from zero, even if there hasn't yet been searched for the vortices dual to eddy currents, which are expressed in the neglected term.
Assuming, a monopole concerns a special form of a field vortex, then immediately gets clear, why the search for magnetic poles has to be a dead end and their failure isn't good for a counterargument: The missing electric conductivity in vacuum prevents current densities, eddy currents and the formation of magnetic monopoles. Potential densities and potential vortices however can occur. As a result can without exception only electrically charged particles be found in the vacuum (derivation in chapter 4.2 till 4.4). Because vortices are more than monopole-like structures depending on some boundary conditions, only the vortex description will be pursued further consequently.
Let us record: Maxwell's field equations can directly be derived from the new dual field approach under a restrictive condition. Under this condition the two approaches are equivalent and with that also error free. Both follow the textbooks and can so to speak be the textbook opinion.
The restriction (b = 0) surely is meaningful and reasonable in all those cases in which the Maxwell theory is successful. It only has an effect in the domain of electrodynamics. Here usually a vector potential A is introduced and by means of the calculation of a complex dielectric constant a loss angle is determined. Mathematically the approach is correct and dielectric losses can be calculated. Physically however the result is extremely questionable, since as a consequence of a complex s a complex speed of light would result (according to the definition $c \equiv 1/\sqrt{\varepsilon \cdot \mu}$). With that electrodynamics offends against all specifications of the textbooks, according to which c is constant and not variable and less then ever complex.
But if the result of the derivation physically is wrong, then something with the approach is wrong, then the fields in the dielectric perhaps have an entirely other nature, then dielectric losses perhaps are vortex losses of potential vortices falling apart?

- Maxwell's field equations:

$$\text{rot } \mathbf{E} = -\,d\mathbf{B}/dt \quad \text{(law of induction)} \qquad (27.1*)$$
$$\text{rot } \mathbf{H} = d\mathbf{D}/dt + \mathbf{j} \quad \text{(Ampère's law)} \qquad (27.13)$$

- describe the special case for b = 0 resp. div B = 0

$$\text{rot } \mathbf{E} = -\,d\mathbf{B}/dt + \mathbf{v}\,\text{div}\,\mathbf{B} = -\,d\mathbf{B}/dt - \mathbf{b} \qquad (27.12)$$
$$\text{rot } \mathbf{H} = d\mathbf{D}/dt - \mathbf{v}\,\text{div}\,\mathbf{D} = d\mathbf{D}/dt + \mathbf{j} \qquad (27.13)$$

The physical meaning of the introduced abbreviations b and j is:

- the current density $\mathbf{j} = -\,\mathbf{v}\,\text{div}\,\mathbf{D} = -\,v_x \cdot \rho_{el}$, (27.15)
- with Ohm's law $\mathbf{j} = \sigma \cdot \mathbf{E} = \mathbf{D}/\tau_1$, and (27.16)
- the potential density $\mathbf{b} = -\,\mathbf{v}\,\text{div}\,\mathbf{B} = \mathbf{B}/\tau_2$,(27.17)
- with the eddy current time constant $\tau_1 = \varepsilon/\sigma$ (27.16*>
- and with the potential vortex time constant τ_2

The complete field equations (27.12 and 27.13) read, with the time constants (τ_1 and τ_2) of the respective field vortex:

- completely extended law of induction (with $B = \mu \cdot H$): (27.18)

$$\text{rot } \mathbf{E} = -\,d\mathbf{B}/dt - \mathbf{B}/\tau_2 = -\,\mu \cdot (d\mathbf{H}/dt + \mathbf{H}/\tau_2) \qquad (27.20)$$

- and the well-known law of Ampere (with $D = \varepsilon \cdot E$): (27.19)

$$\text{rot } \mathbf{H} = d\mathbf{D}/dt + \mathbf{D}/\tau_1 = \varepsilon \cdot (d\mathbf{E}/dt + \mathbf{E}/\tau_1) \qquad (27.21)$$

Fig. 27.10: The extension of the law of induction for vortices of the electric field (potential vortices).<i>

<i>: see also fig. 5.1

27.10 Derivation of the potential vortices

Is the introduction of a vector potential A in electrodynamics a substitute of neglecting the potential density b? Do here two ways mathematically lead to the same result? And what about the physical relevance? After classic electrodynamics being dependent on working with a complex constant of material, in what is buried an unsurmountable inner contradiction, the question is asked for the freedom of contradictions of the new approach. At this point the decision will be made, if physics has to make a decision for the more efficient approach, as it always has done when a change of paradigm had to be dealt with. The abbreviations j and b are further transformed, at first the current density in Ampere's law $j = -v_x \cdot \rho_{el}$ (27.15), as the movement of negative electric charges. By means of Ohm's law $j = \sigma \cdot E$ and the relation of material $D = \varepsilon \cdot E$ the current density j also can be written down as dielectric displacement current with the characteristic relaxation time constant $\tau_1 = \varepsilon/\sigma$ (eq. 27.16) for the eddy currents. In this representation of the law of Ampere (eq. 27.21) clearly is brought to light, why the magnetic field is a vortex field, and how the eddy currents produce heat losses depending on the specific electric conductivity σ. As one sees we, with regard to the magnetic field description, move around completely in the framework of textbook physics.

Let us now consider the dual conditions. The comparison of coefficients (eq. 27.12 + 27.17) looked at purely formal, results in a potential density b in duality to the current density j, which with the help of an appropriate time constant τ_2 founds vortices of the electric field. I call these potential vortices (in eq. 27.20).

In contrast to that the Maxwell theory requires an irrotationality of the electric field, which is expressed by taking the potential density b and the divergence B equal to zero. The time constant τ_2 thereby tends towards infinity. This Maxwell approximation leads to the circumstance that with the potential vortices of the electric field also their propagation as a scalar wave gets lost, so that the Maxwell equations describe only transverse and no longitudinal waves. At this point there can occur contradictions for instance in the case of the near-field of an antenna, where longitudinal wave parts can be detected measuring technically, and such parts already are used technologically in transponder systems e.g. as installations warning of theft in big stores.

It is denominating, how they know how to help oneself in the textbooks of high-frequency technology in the case of the near-field zone<i>. Proceeding from the Maxwell equations the missing potential vortex is postulated without further ado, by means of the specification of a ,,standing wave" in the form of a vortex at a dipole antenna. With the help of the postulate now the longitudinal wave parts are ,,calculated", like they also are being measured, but also like they wouldn't occur without the postulate as a result of the Maxwell approximation.

There isn't a way past the potential vortices and the new dual approach, because no scientist is able to afford to exclude already in the approach a possibly authoritative phenomenon, which he wants to calculate physically correct!

<i>: Zinke, Brunswig: Lehrbuch der Hochfrequenztechnik, 1. Bd., 3. Auflage 1986 Springer-Verlag Berlin, Seite 335

- Under the assumption: E = E(r,t); H = H(r,t) ,
- using the relations of material:

  $\mathbf{B} = \mu \cdot \mathbf{H}$ and $\mathbf{D} = \varepsilon \cdot \mathbf{E}$:
- the complete and extended law of induction reads:

$$\text{rot}\,\mathbf{E} = -\partial\mathbf{B}/\partial t - \mathbf{B}/\tau_2 = -\mu\cdot(\partial\mathbf{H}/\partial t + \mathbf{H}/\tau_2) \quad (27.20)$$

- and the well-known law of Ampere:

$$\text{rot}\,\mathbf{H} = \partial\mathbf{D}/\partial t + \mathbf{D}/\tau_1 = \varepsilon\cdot(\partial\mathbf{E}/\partial t + \mathbf{E}/\tau_1) \quad (27.21)$$

---

if we again apply the curl operation to eq. 27.20 and insert eq. 27.21:

$$-\text{rot rot}\,\mathbf{E} = \mu\cdot\partial(\text{rot}\mathbf{H})/\partial t + (\mu/\tau_2)\cdot(\text{rot}\,\mathbf{H}) \quad (27.22)$$

$$= \mu\cdot\varepsilon\cdot[\partial^2\mathbf{E}/\partial t^2 + (1/\tau_1)\cdot\partial\mathbf{E}/\partial t + (1/\tau_2)\cdot\partial\mathbf{E}/\partial t + \mathbf{E}/\tau_1\tau_2] \quad (27.23)$$

$$= (1/c^2)\cdot[\partial^2\mathbf{E}/\partial t^2 + (1/\tau_1 + 1/\tau_2)\cdot\partial\mathbf{E}/\partial t + \mathbf{E}/\tau_1\tau_2] \quad (27.24)$$

with the definition for the speed of light c:

$$\varepsilon\cdot\mu = 1/c^2 \quad (27.25)$$

the fundamental field equation reads:

$$\underbrace{-c^2\cdot\text{rot rot}\,\mathbf{E}}_{a} = \underbrace{\partial^2\mathbf{E}/\partial t^2}_{b} + \text{(electromagnetic wave)} + \underbrace{(1/\tau_1)\cdot\partial\mathbf{E}/\partial t}_{c} + \underbrace{(1/\tau_2)\cdot\partial\mathbf{E}/\partial t}_{d} + \underbrace{\mathbf{E}/\tau_1\tau_2}_{e} + \text{eddy current} + \text{potential vortex} + I/U \quad (27.26)$$

Fig. 27.11: Derivation of the fundamental field equation
from the equations of transformation of the electromagnetic field.<i>

<i>: The fundamental field equation mathematically describes a wave damped with the vortices of the electric and the vortices of the magnetic field. It is formulated only in space and time. From it can be deduced numerous eigenvalue equations, (i.e. the equation of Schrodinger, fig. 5.1).

27.11 Derivation of the „fundamental field equation"

The two equations of transformation and also the from that derived field equations (27.20 and 27.21) show the two sides of a medal, by mutually describing the relation between the electric and magnetic field strength (between E and H). We get on the track of the meaning of the „medal" itself, by inserting the dually formulated equations into each other. If the calculated H-field from one equation is inserted into the other equation then as a result a determining equation for the E-field remains. The same vice versa also functions to determine the H-field. Since the result formally is identical and merely the H-field vector appears at the place of the E-field vector and since it equally remains valid for the B-, the D-field and all other known field factors, the determining equation is more than only a calculation instruction. It reveals a fundamental physical principle. I call it the "fundamental field equation".

The derivation always is the same: If we again apply the curl operation to rot E (law of induction 27.20) also the other side of the equation should be subjected to the curl. If for both terms rot H is expressed by Ampere's law 27.21, then in total four terms are formed (27.26): the wave equation (a-b) with the two damping terms, on the one hand the eddy currents (a-c) and on the other hand the potential vortices (a-d) and as the fourth term the Poisson equation (a-e), which is responsible for the spatial distribution of currents and potentials <i>.

Not in a single textbook a mathematical linking of the Poisson equation with the wave equation can be found, as we here succeed in for the first time. It however is the prerequisite to be able to describe the conversion of an antenna current into electromagnetic waves near a transmitter and equally the inverse process, as it takes place at a receiver. Numerous model concepts, like they have been developed by HF- and EMC-technicians as a help, can be described mathematically correct by the physically founded field equation.

In addition further equations can be derived, for which this until now was supposed to be impossible, like for instance the Schrodinger equation (chapter 5.6-5.9). This contrary to current opinion isn't a wave equation at all, since the term (b) with the second time derivation is missing. As diffusion equation it has the task to mathematically describe field vortices and their structures.
As a consequence of the Maxwell equations in general and specifically the eddy currents not being able to form structures, every attempt has to fail, which wants to derive the Schrodinger equation from the Maxwell equations.
The fundamental field equation however contains the newly discovered potential vortices, which owing to their concentration effect (in duality to the skin effect) form spherical structures, for which reason these occur as eigenvalues of the equation. For these eigenvalue-solutions numerous practical measurements are present, which confirm their correctness and with that have probative force with regard to the correctness of the new Held approach and the fundamental field equation. By means of the pure formulation in space and time and the interchangeability of the field pointers here a physical principle is described, which fulfills all requirements, which a world equation must meet.

<i>: see also fig. 5.1

Comparison:

• The **Faraday approach** is universal	• **Maxwell's field equations** can be derived!
• It reveals a **physical principle**	• The field equations describe only a **special case**!
• The field is the cause for the particles • (Principles of causality are preserved)	• Particle and field are cause and effect at the same time • (Violation of the rules of causality)
• Particles probably are **field configurations** • Quanta can be calculated as **field vortices** (without any hypothesis) • All **quantum properties** can be **calculated** likewise	• Particles consist of hypothetic subparticles • **Quark-hypothesis** must replace missing calculation • Sorting und systematizing of the properties in the **standard-model**
• **Potential vortices** form electric field vortices (the E-field is a source free vortex field)	• The electric field is **irrotational** (the E-field is an irrotational field of sources)
• Field vortices carry momentum and form a scalar wave • Longitudinal wave with arb. velocity of propagation v	• Electromagnetic wave is a transverse wave • Constant propagation with the speed of light c
⇒ **theory of objectivity**	⇒ **theory of relativity**

Fig. 27.12: Comparison of the field-theoretical approaches according to Faradav and according to Maxwell.

27.12 The Maxwell field as a derived special case

As the derivations show, nobody can claim there wouldn't exist potential vortices and no propagation as a scalar wave, since only the Maxwell equations are to blame that these already have been factored out in the approach. One has to know that the field equations, and may they be as famous as they are, are nothing but a special case, which can be derived.

The field-theoretical approach however, which among others bases on the Faraday-law, is universal and can't be derived on its part. It describes a physical basic principle, the alternating of two dual experience or observation factors, their overlapping and mixing by continually mixing up cause and effect. It is a philosophic approach, free of materialistic or quantum physical concepts of any particles.

Maxwell on the other hand describes without exception the fields of charged particles, the electric field of resting and the magnetic field as a result of moving charges. The charge carriers are postulated for this purpose, so that their origin and their inner structure remain unsettled and can't be derived. The subdivision e.g. in quarks stays in the domain of a hypothesis, which can't be proven. The sorting and systematizing of the properties of particles in the standard-model is nothing more than unsatisfying comfort for the missing calculability.

With the field-theoretical approach however the elementary particles with all quantum properties can be calculated as field vortices (chap. 7). With that the field is the cause for the particles and their measurable quantization. The electric vortex field, at first source free, is itself forming its field sources in form of potential vortex structures. The formation of charge carriers in this way can be explained and proven mathematically, physically, graphically and experimentally understandable according to the model.

Where in the past the Maxwell theory has been the approach, there in the future should be proceeded from the equations of transformation of the field-theoretical approach. If now potential vortex phenomena occur, then these also should be interpreted as such in the sense of the approach and the derivation, then the introduction and postulation of new and decoupled model descriptions isn't allowed anymore, like the near-field effects of an antenna, the noise, dielectric capacitor losses, the mode of the light and a lot else more.

The at present in theoretical physics normal scam of at first putting a phenomenon to zero, to afterwards postulate it anew with the help of a more or less suitable model, leads to a breaking up of physics into apparently not connected individual disciplines and an inefficient specialisthood. There must be an end to this now! The new approach shows the way towards a unified theory, in which the different areas of physics again fuse to one area. In this lies the big chance of this approach, even if many of the specialists at first should still revolt against it.

This new and unified view of physics shall be summarized with the term "theory of objectivity". As we shall derive, it will be possible to deduce the theory of relativity as a partial aspect of it (chapter 6 and 28).

Let us first cast our eyes over the wave propagation.

- Starting-point: the fundamental field equation

$$-c^2 \cdot \mathrm{rot}\,\mathrm{rot}\,\mathbf{B} = \frac{d^2\mathbf{B}}{dt^2} + \frac{1}{\tau_2}\frac{d\mathbf{B}}{dt} + \frac{1}{\tau_1}\frac{d\mathbf{B}}{dt} + \frac{\mathbf{B}}{\tau_1\tau_2} \quad (27.26^*)$$

- with a magnetic flux density $B = B(r(t))$.

1st condition for eq. 27.26*:
the special case, if $\sigma=0$ and $\sigma/\varepsilon = (1/\tau_1) = 0$. (27.16*)

The remaining vortex term is transformed by applying already used relations (eq. 27.10 and eq. 27.17):

$$\frac{1}{\tau_2}\cdot\frac{d\mathbf{B}}{dt} = \mathbf{v}\cdot\mathrm{grad}\,\frac{\mathbf{B}}{\tau_2} \quad (27.10) \qquad \frac{\mathbf{B}}{\tau_2} = -\mathbf{v}\cdot\mathrm{div}\,\mathbf{B} \quad . \ (27.17)$$

If the velocity of propagation: $v = (v_x, v_y=0, v_z=0)$; $v = dx/dt$, then the simplified field equation (if the coordinates are orientated on the vector of velocity) results in the general wave equation (involved with the x-component) in the form:

$$\|\mathbf{v}\|^2\,\mathrm{grad}\,\mathrm{div}\,\mathbf{B} - c^2\,\mathrm{rot}\,\mathrm{rot}\,\mathbf{B} = d^2\mathbf{B}/dt^2 \quad (27.27)$$

longitudinal	transverse	wave
with v = arbitrary	with c = const.	velocity of propagation

2nd condition for eq. 27.28: $v = c$.

The wave equation in the usual notation (= inhomogeneous Laplace equation, = purely a special case!) now reads:

$$\Delta\mathbf{B} = \mathrm{grad}\,\mathrm{div}\,\mathbf{B} - \mathrm{rot}\,\mathrm{rot}\,\mathbf{B} = (1/c^2)\cdot d^2\mathbf{B}/dt^2 \quad (27.28)$$

Fig. 27.13: Derivation of the wave equations (inhomogeneous
Laplace equation) as a special case of the equations of transformation of the electromagnetic field.

27.13 Derivation of the wave equation

The first wave description, model for the light theory of Maxwell, was the inhomogeneous Laplace equation:

$$\Delta\mathbf{E}\cdot c^2 = d^2\mathbf{E}/dt^2 \quad \text{with} \quad \Delta\mathbf{E} = \text{grad div } \mathbf{E} - \text{rot rot } \mathbf{E} \qquad (27.28^*)$$

There are asked some questions:

- Can also this mathematical wave description be derived from the new approach?
- Is it only a special case and how do the boundary conditions read?
- In this case how should it be interpreted physically?
- Are new properties present, which can lead to new technologies?

Starting-point is the fundamental field equation (27.26). We thereby should remember the interchangeability of the field pointers, that the equation doesn't change its form, if it is derived for H, for B, for D or any other field factor instead of for the E-field pointer. This time we write it down for the magnetic induction B and consider the special case, that we are located in a badly conducting medium, as is usual for the wave propagation in air. But with the electric conductivity σ also $1/\tau_1 = \sigma/\varepsilon$ tends towards zero (eq. 27.16*). With that the eddy currents and their damping and other properties disappear from the field equation, what also makes sense. There remains the potential vortex term $(1/\tau_2)$*dB/dt , which using the already introduced relations (eq. 27.10 and 27.17) involved with an in x-direction propagating wave ($v = (v_x, v_y = 0, v_z = 0)$) can be transformed directly into:

$$-\|\mathbf{v}\|^2 \cdot \text{grad div } \mathbf{B}$$

The divergence of a field vector (here B) mathematically seen is a scalar, for which reason this term as part of the wave equation founds so-called „scalar waves" and that means that potential vortices, as far as they exist, will appear as a scalar wave. We at this point tacitly anticipate chapter 28, which provides the reason for the speed of light losing its vectorial nature, if it is correlated with itself. This insight however is valid in general for all velocities (v = dr/dt), so that in the same way a scalar descriptive factor can be used for the velocity (v = dx/dt) as for c.

From the simplified field equation (27.26*) the general wave equation (27.27) can be won in the shown way, divided into longitudinal and transverse wave parts, which however can propagate with different velocity.

Physically seen the vortices have particle nature as a consequence of their structure forming property. With that they carry momentum, which puts them in a position to form a longitudinal shock wave similar to a sound wave. If the propagation of the light one time takes place as a wave and another time as a particle, then this simply and solely is a consequence of the wave equation. Light quanta should be interpreted as evidence for the existence of scalar waves. Here however also occurs the restriction that light always propagates with the speed of light. It concerns the special case v = c. With that the derived wave equation (27.27) changes into the inhomogeneous Laplace equation (27.28). The electromagnetic wave in both cases is propagating with c. As a transverse wave the field vectors are standing perpendicular to the direction of propagation. The velocity of propagation therefore is decoupled and constant. Completely different is the case for the longitudinal wave. Here the propagation takes place in the direction of an oscillating field pointer, so that the phase velocity permanently is changing and merely an average group velocity can be given for the propagation. There exists no restriction for v and v = c only describes a special case.

• From the dual field-theoretical approach are derived:	From Maxwell's field equations can be derived:
=> Maxwell's field equations	=> 0
=> the wave equation (with transverse and longitudinal parts)	=> only transverse waves (no longitudinal waves)
=> scalar waves (Tesla-/neutrino radiation)	=> 0 (no scalar waves)
=> vortex and anti-vortex (current eddy and potential vortex)	=> only eddy currents
=> Schrodinger equation (basic equation of chemistry)	=>0
=> Klein-Gordon equation (basic eq. of nuclear physics)	=>0

Fig. 27.14: Comparison of the efficiency of both approaches.

(as an interim result, if it concerns the question, which approach of the two is the more efficient one and which one better should be discarded. The final balance is made in chapter 28).
It here concerns partial aspects of the following theories:

=> theory of objectivity	=> theory of relativity

27.14 The new field approach in synopsis

Proof could be furnished that an approximation is buried in Maxwell's field equations and that they merely represent the special case of a new, dually formulated and more universal approach. The mathematical derivations of the Maxwell field and the wave equation disclose, of what the Maxwell approximation consists. The anti-vortex dual to the expanding eddy current with its skin effect is neglected. This contracting anti-vortex is called potential vortex. It is capable of forming structures and propagates as a scalar wave in longitudinal manner in badly conducting media like air or vacuum.

At relativistic velocities the potential vortices are subject to the Lorentz contraction. Since for scalar waves the propagation occurs longitudinally in the direction of an oscillating field pointer, the potential vortices experience a constant oscillation of size as a result of the oscillating propagation. If one imagines the field vortex as a planar but rolled up transverse wave, then from the oscillation of size and with that of wavelength at constant swirl velocity with c follows a continual change in frequency, which is measured as a noise signal.

The noise proves to be the in the Maxwell equations neglected potential vortex term, which founds scalar waves. If at biological or technical systems, e.g. at antennas a noise signal is being measured, then that proves the existence of potential vortices, but it then also means that the scope of the Maxwell theory has been exceeded and erroneous concepts can be the result.

As an answer to the question about possible new technologies is pointed to two special properties.

1st potential vortices for reason of their particle nature carry momentum and energy. Since we are surrounded by noise vortices, an energy technical use of scalar waves would be feasible, where the noise power is withdrawn of the surroundings. There is evidence that biological systems in nature cover their need for energy in this way. But at least an energy transmission with scalar waves already would be a significant progress with regard to the alternating current technology of today.

2nd the wavelength multiplied with the frequency results in the velocity of propagation v of a wave $(\lambda \cdot f = v)$, and that for scalar waves by no means is constant. With that wavelength and frequency aren't coupled anymore; they can be modulated separately, for which reason for scalar waves a whole dimension can be modulated additionally compared to the Hertzian wave. In that the reason can be seen, why the human brain with just 10 Hz clock frequency is considerably more efficient than modern computers with more than 1 GHz clock frequency. Nature always works with the best technology, even if we haven't yet understood it.

If we would try to learn of nature and an energy technical or an information technical use of scalar waves would occur, then probably nobody wanted to have our today still highly praised technology anymore. In the course of the greenhouse gases and the electrosmog we have no other choice than to scientifically occupy us with scalar waves and their technical use.

Equations of transformation

of the electric and of the magnetic field[i]

$$\mathbf{E} = \mathbf{v} \times \mathbf{B} \quad (27.1) \text{ and } \quad \mathbf{H} = -\mathbf{v} \times \mathbf{D} \quad (27.2)$$

with: $\mathbf{B} = \mu \cdot \mathbf{H}$ (28.1) and $\mathbf{D} = \varepsilon \cdot \mathbf{E}$ (28.2)

$$\mathbf{E} = \mu \cdot \mathbf{v} \times \mathbf{H} \quad (27.3) \text{ and } \quad \mathbf{H} = -\varepsilon \cdot \mathbf{v} \times \mathbf{E} \quad (27.4)$$

Experience/observation is dependent on the relative velocity v !

Written down in general with field vectors:		Written down in components in Cartesian coordinates: (unit vectors $\mathbf{e}_x$, $\mathbf{e}_y$, $\mathbf{e}_z$)
	in $\mathbf{e}_x$-direction:	$\mathbf{v} = v_x(x(t)) = dx/dt$
$\mathbf{H} = -\varepsilon \cdot \mathbf{v} \times \mathbf{E}$	in $\mathbf{e}_y$-direction:	$\mathbf{H} = -H_y = -\varepsilon \cdot v_x \cdot E_z$
$\mathbf{E} = \mu \cdot \mathbf{v} \times \mathbf{H}$	in $\mathbf{e}_z$-direction:	$\mathbf{E} = E_z = \mu \cdot v_x \cdot H_y$
inserted into each other:		(28.3)
$\mathbf{E} = -\varepsilon \cdot \mu \cdot [\mathbf{v} \times (\mathbf{v} \times \mathbf{E})]$	in $\mathbf{e}_z$-direction:	$E_z = \varepsilon \cdot \mu \cdot v_x \cdot v_x \cdot E_z$
$\mathbf{E} = -(1/c^2) \cdot [\mathbf{v} \cdot \underbrace{(\mathbf{v} \cdot \mathbf{E})}_{=0, \text{ since } \perp} - \mathbf{E} \cdot (\mathbf{v} \cdot \mathbf{v})]$		$E_z = (1/c^2) \cdot v_x^2 \cdot E_z$
$\mathbf{E} = +(\mathbf{v}^2/c^2) \cdot \mathbf{E}$	resp.:	$E_z = (v_x^2/c^2) \cdot E_z$ (28.4)
result:[ii]	$v = c$	(28.5)

Fig. 28.1: The equations of transformation,[i]

<i>: see part 1, chap. 6.5, eq. 60
<ii>: R. W. Pohl: Einfuhrung in die Physik, Bd. 2 Elektrizitatslehre, 21. Aufl. Springer-Verlag 1975, Seite 77, s.a. Kommentar auf Tafel 27.8
<iii>: chapter 28 is a repetition of chapter 6

28. Objectivity versus relativity

The new and field-theoretical approach contains the Maxwell-equations, but goes over and above these in one point. It describes potential vortices and their propagation in space as a scalar wave. With that can also a conclusive answer be given to the often-asked question for the medium and the mediated particles, which is a prerequisite for every longitudinal wave. Mediated are vortex structures with particle nature and the field itself functions as a medium. Is with that also answered the question concerning the aether?[iii]

28.1 The question concerning the aether

Do you know the Maxwell-experiment? No, you wouldn't be able to, since the intellectual father fast did make a backdown, after it didn't work out. Today one speaks of the Michelson-experiment and it may be connected with any other names (Morley, etc.). Remember: In his light theory Maxwell had determined a particular and constant value for the speed of light and for that there should be a physical reason, which should have its cause in the aether. By means of proving this aether Maxwell wanted to prove his theory, but this enterprise thoroughly went wrong.
The consideration was as follows: If the Earth is spinning and is moving through the cosmos, then one should be able to detect an aetherwind and different values for c in the different points of the compass. Maxwell found support for his project at the observatory, since with the aberration of the stars Bradley previously had described an observation, which could be considered as evidence for an aether. The director of the observatory charged his assistant Dr. Michelson with the task, to carry out a corresponding proof of an aether this time in a terrestrial experiment. But such an aether couldn't be proven, what Maxwell had to accept as a severe strike against his light theory. Seven years later Maxwell got the acknowledgement, however from a completely other corner by means of the experiments concerning the radio transmission of Heinrich Hertz.

Until today the question has remained open why astrophysics can prove the aether, whereas the detection in a terrestrial laboratory fails and it looks like there doesn't exist an aether. But as definition for the cause of c the aether can't be abolished as long as it is unsettled why the light is propagating with c of all possible velocities. The question is asked, what determines the propagation of light from today's point of view? Now, by means of outside fields the light can be slowed down. At present the world record lies at less than 65 kilometers per hour in a Bose-Einstein condensate. If electromagnetic fields determine the speed of light, if in addition field or gravitational lenses should confirm this, then the field takes over the task of the aether!

At this place the new field-theoretical approach shows its capabilities. The equations of transformation say nothing but that a moving H-field transforms to a resting E-field and vice versa, that thus in the place of a moving aether, the aetherwind, a resting aether is found. Doing so the dual field partners merely exchange their places. Therefore it is a wild-goose chase, wanting to measure an aetherwind with gauges, which underlie the same field (fig. 28.2).
Michelson had to fail.

The equations of transformation say:

$$\mathbf{E} = \mu \cdot \mathbf{v} \times \mathbf{H} \quad (27.3) \text{ and } \quad \mathbf{H} = -\varepsilon \cdot \mathbf{v} \times \mathbf{E} \quad (27.4)$$

- Experience/observation depends on the relative velocity v!
- The field takes over the function of the aether (determines c) and
- an aetherwind v x H is measured as a resting aether E and vice versa!

- for v = c the equations of transformation turn into each other and are identical [$v = v_x(x(t))$].
- for v < c a motion field E_v depending on v is resulting

$$E_v = E \cdot (v^2/c^2) \quad (28.6)$$

- for v = 0 also $E_v = 0$.
- the motion field overlaps the E-field
  - in the case of vortex fields the effect overlaps the cause and itself is the cause for a new effect.
- The overlap reaches to infinity, where each time is valid:

$$E_{n+1} = E_n \cdot (v^2/c^2) \quad (28.7)$$

- the field Eo overlaps the motion field E_v

$$E = E_0 + E_v = E_0 \cdot (1 + v^2/c^2) \quad (28.8)$$

- for infinite overlap:

$$E = E_0 + E_1 + E_2 + E_3 + E_4 + \ldots + E_n + E_{n+1} + \ldots \quad (28.9)$$

- results in the power series:

$$E = E_0 \cdot [1 + (v/c)^2 + (v/c)^4 + (v/c)^6 + \ldots + (v/c)^{2n} + (v/c)^{2(n+1)} + \ldots] \quad (28.10)$$

Fig. 28.2: Power series as a result of a vortex overlap.

<i>: Grimsehl: Lehrbuch der Physik, 2.Bd., 17.Aufl. Teubner Verl. 1967, S. 130.

<ii>: R.W.Pohl: Einfuhrung in die Physik, Bd.2 Elektrizitatslehre, 21.Aufl. Springer-Verlag 1975, Seite 72 und 76, bzw. 130.

<iii>: K. Simonyi: Theoretische Elektrotechnik, 7.Aufl. VEB Berlin 1979, Seite 924.

<i4>: E. Friebe: Die Vektorprodukte der Maxwell'schen Elektrodynamik, DPG-Didaktik-Tagungsband 1995, S.396

28.2 Vortices, an overlap of the overlap

Not with any approach until now the question concerning the aether could be solved. Only the new field-theoretical approach proves with the unambiguous and free of contradiction clarification of the question concerning the aether its unmatched superiority. We hence without exception work with this approach, which is anchored tightly in textbook physics. The two equations of transformation on the one hand are the law concerning the unipolar induction according to Faraday (27.1) and on the other hand the dual formulation (27.2), which Grimsehl[<i>] calls convection equation. Grimsehl goes around the question for the correct sign by means of forming a modulus. Pohl draws detailed distinctions of cases and dictates the each time relevant formulation of the dual law[<ii>]. The sign eventually should be chosen according to the definition of the orientation of the field pointers. Also Simonyi gives both equations and the each time appropriate experiments[<iii>].

If we assume the carrier of an electric field is moving with the not accelerated relative velocity v with regard to the reference system used by the observer, then a magnetic H-field is observed, which stands perpendicular both to the direction of the E-field and to the direction of v. If the motion takes place perpendicular to the area stretched by E- and H-field, then the H-field again is observed and measured as an E-field. There will occur an overlap of the fields.

In spite of that we first consider the theoretical case, that no overlap is present, and the observer as it were sees himself. The result is trivial: the relative velocity v must be the speed of light $v = c$. (28.5) If considered at the speed of light, the two equations of transformation turn into each other. They now are identical both mathematically and in their physical expressiveness. For this case it actually is possible, to derive the dual law straight from the Faraday law. For a wave propagating with the speed of light, to name an example, the field strength propagating along is always equal to the causing field strength, which depends on position.

If besides the evaluation of the values also the circumstance is considered that it concerns vectors, then at this place a problem as a matter of principle of the Maxwell theory gets visible, to which has been pointed occasionally, e.g. at the German Physical Society[<i4>]. The derivation of the speed of light from two vector equations requires, that c also has to be a vector. The question is: How the velocity vector v suddenly becomes the scalar and not pointing, in all directions of space constant factor c? Is therefore for mathematical and physical reasons "the Maxwell theory in essential parts erroneous", according to a statement of the German Patent Office[<i4>]?

Now, the constancy of the speed of light is a fact, which even can be derived. We at first will be content with the clue that for every observation with the speed of light, with the eyes or a gauge constructed corresponding to our perception, the vector in all its components each time is correlated to itself, by what actually the orientation of direction gets lost. Under these for c and with equal rights also for v relevant circumstances we are entitled to calculate further with the values.

An observer, who is moving with v slower than c, will besides the original E-field also observe a motion field E_v depending on the velocity v, which disappears, if v becomes zero. What he catches sight of and is able to register with gauges in the end is the overlap of both field components.

- concerning the development of the power series:

$$E = E_0 \cdot [1 + (v/c)^2 + (v/c)^4 + (v/c)^6 + \ldots + (v/c)^{2n} + (v/c)^{2(n+1)} + \ldots] \quad (28.10)$$

- for $q < 1$ the power series with $q = (v/c)^2$ will converge (28.11)

$$\sum_{n=0}^{\infty} q^n = \frac{1}{1-q} \quad (28.12)$$

- for $(v/c)^2 < 1$ resp. for $v < c$ therefore is valid:

$$E = E_0 \cdot [1/1 - (v/c)^2] \quad \text{resp.} \quad E_0 = E \cdot [1 - (v/c)^2] \quad (28.13)$$

The square root of Lorentz appears in squared form<i>:

$$\left(1 - \frac{v^2}{c^2}\right) = \frac{E_0}{E} \quad (28.14)$$

The derivation for the magnetic field strength analogous to that provides the identical result<i>:

$$\left(1 - \frac{v^2}{c^2}\right) = \frac{H_0}{H} \quad (28.15)$$

Fig. 28.3 The field dilatation depending on velocity

<i>: see part 1, chap. 6.6

<ii>: Prof. Dr. H.-J. Runckel, Abteilung fur Mathematik IV der Universitat Ulm

28.3 Field overlap

But it doesn't abide by this one overlap. In the case of vortex fields the effect overlaps the cause and itself becomes the cause for a new effect. The overlapped cause produces a further effect, which for its part is overlapping (see chap. 3).

Vortices thus arise, if overlaps for their part are overlapping and that theoretically reaches to infinity, to which I already repeatedly have pointed (fig. 3.0). In addition do vortices represent a fundamental physical principle. The Greek philosopher Demokrit has traced back the whole nature to vortex formation and that already 2500 years ago!

In the field-theoretical approach this interpretation seems to experience a mathematical confirmation, since also the fields are overlapping in vortex structures. According to that we owe our observations and our being the relative movements and the vortex formation. If reversed there wouldn't be any movement, then there also would not exist fields, light nor matter. If we observe the sky, then everything visible follows the movement of its own of the Earth, of the solar system and the whole galaxy, which is on its way with unknown galactic velocity, and all movements take place in vortex structures (fig. 10.2).

The field overlap dictated by the Faraday-approach as well reaches to infinity, what has stimulated my colleagues of mathematics to also mathematically put into practice this physical requirement[ii]. This leads to an infinite power series, which converges under the condition that $v < c$.

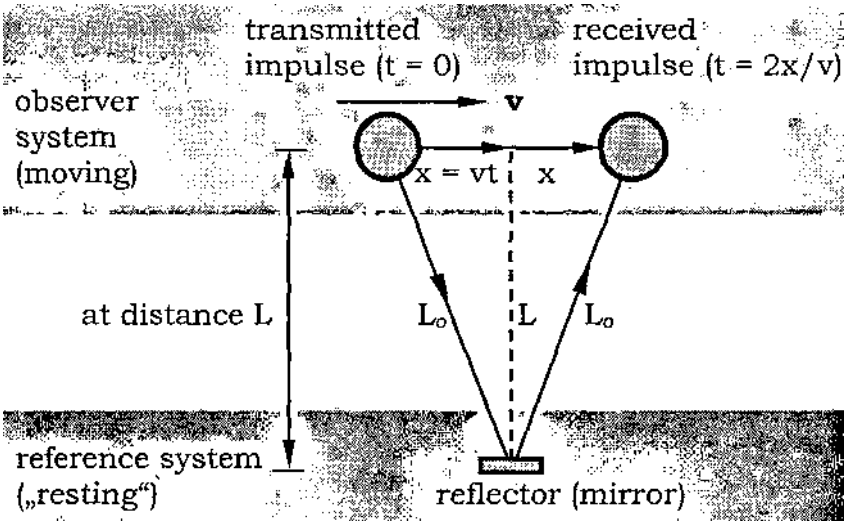
As a result of the power series development the well-known square root $\sqrt{1-(v^2/c^2)}$ of Lorentz occurs in squared form (see also fig. 6.6). It determines the relation of the observed and the causing field strength of the electric or the magnetic field. Physically the found relation describes a dilatation field depending on velocity. The field strength thus increases, if the relative velocity v increases, or inversely no difference is observable anymore, if v tends towards zero.

Whoever wants to compete with Albert Einstein (1879-1955), who has developed the theory of relativity from the length contraction, which depends on velocity, could be inclined to derive a new field physics from the field dilatation. But I must warn of such a step. The derivation of the length contraction by the mathematician Hendrik Lorentz (Lorentz contraction) assumes a number of limiting conditions. The relative velocity v for instance may not experience any acceleration. Actually however almost all motion takes place as circular vortex motion, so that due to the occurring centripetal acceleration the conditions for the theory of relativity aren't fulfilled anymore. Neglects or generalizations thereby can lead to considerable errors, of which I would like to warn. It in general is a delicate enterprise, if one wants to provide a physical interpretation for a purely mathematically won result.

This warning to the same extent also is valid for the here shown derivation of the field dilatation. The limiting conditions practically are the same as for Einstein and the problems with a provided physical interpretation won't be less. Also here lots of paradoxes will occur, which are nothing but errors of the theory. So we won't reach our destination.

There now only one further mathematical step is necessary, which links the theory of relativity with the new notion of a field dilatation depending on velocity.

Example:
Measurement of length by means of a measurement of propagation time (sound or light) with c = L/t in a vehicle moving with v.



From driving time t:

$t = 2\frac{x}{v}$ = signal propagation time: $t = 2\frac{L_o}{c}$ follows $\boxed{\frac{x}{v} = \frac{L_o}{c}}$

According to Pythagoras: $L_o^2 = L^2 + x^2 = L^2 + L_o^2 \cdot (v^2/c^2)$

$$L_o^2 \cdot (1 - v^2/c^2) = L^2$$

the shortening of the rule results in:

$$\boxed{(1 - \frac{v^2}{c^2}) = (\frac{L}{L_o})^2} \quad (28.16)$$

Fig. 28,4: _____Derivation of the length contraction

Examples: contraction according to Lorentz transformation, measurable length shortening, curvature of space.

Counterexample: unsuccessful aether detection (Michelson experiment)

28.4 The derivation of the length contraction

The Lorentz transformation is the result of a purely mathematical problem. Stimulated by the surprisingly result of the Michelson experiment the Dutchman Hendrik A. Lorentz 1891 asked himself, how the equations of the Galilei-transformation would have to look like, if the propagation of light wouldn't be infinitely fast but finite and constant. He thereby proceeds from the assumption of two inertial systems moving against one another with a not accelerated velocity v, in which the laws of Newtonian physics are equally valid<i>. As a result of the relative motion a change of the length measures will occur.

This at first can be explained as a purely geometric effect in the context of nonrelativistic physics. We imagine a vehicle, which is on its way with constant velocity, and emits an optical or acoustical signal. Sideways in the countryside is standing in a perpendicularly measured distance L a reflector (mirror), which sends the signal back again. The velocity of the signal however isn't infinitely fast and from that follows that the vehicle during the propagation time of the signal as well has moved a bit further. The actual way, which the signal had to cover now amounts to L_o (> L). The distance measure thus is observed smaller as it is in reality, to be specific for the factor of the square root of Lorentz (fig. 28.4).

$$L = L_o \cdot \sqrt{1-(v^2/c^2)} \quad (28.16)$$

According to the principle of relativity it doesn't play a role, if the vehicle is driving or if it is standing still and the mirror is moving with a linear uniform velocity.

Initially Einstein also only spoke of an observable length contraction, which must not necessarily occur in reality, an optical deception so to speak. Lorentz however proceeded from the assumption of a physical length change, thus a length change existing in reality, what in practice at first makes no difference. If e.g. at relativistic velocities a rocket becomes smaller, then the pilot equally shrinks, so that it would not be possible to notice a present difference.

If however the observer stands outside the events and takes a „neutral standpoint", then he will be able to see, which interpretation is the right one. Today some examples are known. In accelerators particles at relativistic fast velocities actually get smaller for the factor of the square root of Lorentz. That has been proven and this result afterwards gives the Dutchman Lorentz right! The followers of the physical length contraction also are called Neo-Lorentzians.

In the vicinity of a gravitational mass the speed of light becomes so slow, that the shortening factor plays a role and space is curved towards the mass. To understand this shortening of scale, the influence of the field also should be considered.

<i>: Example: In a closed lift physical experiments are being carried out. Accelerations of the lift have an influence on the experiments. However no influence can be detected, if the lift is standing still or is moving with constant velocity. It with that fulfills the conditions of an inertial system. The question is: what do the experiments show someone standing outside, whom the lift passes by?

From the comparison of the Lorentz contraction (28.16)
with the field dilatation (28.14 and 28.15)

$$(1 - \frac{v^2}{c^2}) = (\frac{L}{L_o})^2 \quad \stackrel{!}{=} \quad (1 - \frac{v^2}{c^2}) = \frac{E_o}{E} = \frac{H_o}{H}$$

follows

$$(1 - \frac{v^2}{c^2}) = (\frac{L}{L_o})^2 = \frac{E_o}{E} = \frac{H_o}{H} \qquad (28.17)$$

the proportionality (length measures depending on field):

$$E, H \sim 1/L^2 \quad \text{and} \quad Eo, Ho \sim 1/L_0^2 \qquad (28.18)$$

Experimental examples<i>:

- Electrostriction (piezo speaker)
- Magnetostriction
- Field or gravitational lenses
- Curvature of space, deflection of light

Conclusion<ii>:

- The field determines the length measures (what is 1 meter)
- The field determines the velocities v (in m/s)
- The field determines the speed of light c [m/s]
- Measurement of the speed of light is made with itself:

$$c \sim r \qquad (28.19)$$

- Measured is a constant of measurement c = 300.000 km/s
- The speed of light c is not a constant of nature!

Fig. 28.5: The dependence of the Lorentz contraction on the field

<i>: see part 1, chap. 6.10
<ii>: see part 1, chap. 6.11

28.5 The dependence of the Lorentz contraction on the field

The two results of the field dilatation (28.14 and 28.15) and of the Lorentz contraction (28.16) must be brought together and compared (28.17). Doing so the mathematical expression of the square root of Lorentz is cancelled out. That is of utmost importance, since with that also all limits disappear and there remains a purely physical relation, a proportionality of utmost importance (28.18).

What was the sense of the limits associated with the introduction of so-called inertial systems, which are the basis of the Lorentz transformation and which were adopted for our derivation of the field dilatation? They now only are auxiliary considerations according to model. We have chosen a very simple model, which can be described mathematically, in which an observer holds in his hand gauges for distances and field strengths and with that gauges a system flying by with constant velocity. He on the one hand determines a length contraction and on the other hand a field dilatation. He compares both with each other and comes to the conclusion: The field determines the dimensions!

This statement is purely physical and it is generally valid. It is independent of the relative velocity and all other mathematical conditions. A centrally accelerated circular motion e.g. will falsify the length contraction to the same extent, as the at the same time occurring field dilatation. It can be expected, that in addition to the square root of Lorentz also other errors will mutually efface, so that a generalization in this case actually seems to be allowed.

The won proportionality is of most elementary importance. We use it in the case of the piezo speaker and know it from the curvature of space and deflection of light in presence of extreme fields. If we ourselves however are exposed to the field as an observer, in which also the object to be observed is situated, then we are in the dilemma, not being able to perceive the influence. If we, to stay with the example, would sit in a rocket and this would become smaller at faster velocity, then we would notice nothing, since we also would shrink along to the same extent.

That concerns every measurement of velocity in general and the speed of light c in particular, which as is well-known is measured in meters per second. But if the field determines c and in the same way the length measure, which is given in meters, then both stand in a direct proportionality to each other, then we won't have the slightest chance to measure the speed of light. If namely c is changed, then this concerns the measurement path in the same way. Now the variable is measured with itself and as a result appears c, a constant value. We neither can see the change, since our eyes scan all objects optically and that means with c.

It is the nightmare of each and every measurement engineer, if the gauge depends on the factor to be measured. No wonder, if the theorem of addition of the velocities apparently loses its validity and always the same c is being measured, independent of the direction in which the source of radiation is moving (chap. 6.11). The result is:

The speed of light is a constant of measurement and not a constant of nature!

If however the light is scanned with the speed of light, then also all components of the light vector correlated with themselves result in the same constant value c, then actually the vector of the speed of light loses its orientation in space and becomes a scalar factor. The Maxwell equations already anticipate this circumstance, but without providing an explanation why this is correct. Only the new field approach can answer the open question. With the derivation an axiom of physics - one also can say stumbling block - has been overcome.

The field strength determines the length measure:
(the distance L between the spheres)<i>

$$E, H \sim 1/L^2 \qquad (28.18)$$

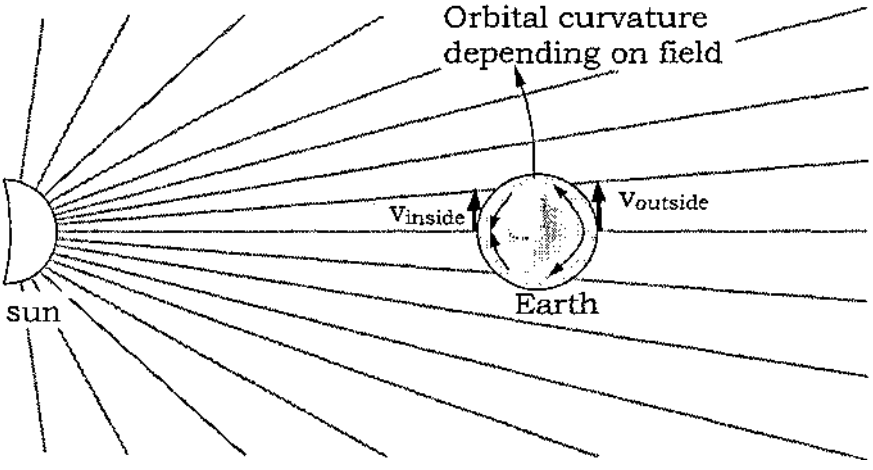


Fig. 28.6 A: The curvature of the Earth in the gravitational field of the sun

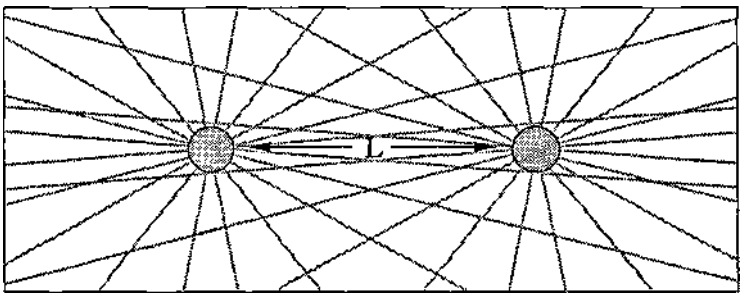


Fig. 28.6 B: Force of attraction and reduction of the distance L
as the mutual field influence of two masses.

<i>: Repetition of part 1, chapter 6.7

28.6 Boscovich and the respiration of the Earth

Who has got a good idea, fast will find that some other scientist had the same idea already before, and for his part possibly already had to make the same experience. If in spite of that the track fast loses in history, it as a rule is because of the insufficient citing and the vanity of the discoverers, who in reality only are rediscoverers of a much older knowledge.

The dependence of the length measures on the field (eq. 28.18) in the mathematical form of the derivation however should still be quite new. But the physical consequence already was described by the Jesuit priest Roger Joseph Boscovich from Dalmatia in 1755[<i>]. He was Professor for mathematics and theology in Rome and spoke about the world on the one hand being deformable, similar to rubber, but on the other hand we aren't able to perceive this, since our body is made of the same material and follows all changes. „We in an absolute way can recognize neither the place, nor distances or orders of magnitude", writes Boscovich in his book about space and time and writes how these are perceived by us[<ii>]. He suspects that the Earth unobservable for man „is respiring".

Actually a terrestrial observer at daytime is situated closer to the sun than in the night. He by day is exposed to a slightly stronger field and as a result correspondingly smaller. He himself and all objects in his neighbourhood are subject to an identical fluctuation of size, so that this „respiration" of the Earth cannot be detected. It can be detected neither with a tape measure nor with an optical measurement and still is present in reality. Only from a neutral standpoint we can succeed to recognize the actually existing curvature of space (fig. 28.6 A).
An example is the duration of the sunshine at the equator, which is longer than can be expected from the spherical form of the Earth. This reveals, how the Earth is bending towards the sun (see also chapter 6.7).
A further example is the influence of the field on the orbital velocity of the Earth measured in meters per second. Here also the meter at daytime is smaller than in the night, for which reason the Earth is moving slower on the side turned towards the sun, like a track vehicle, which drives a turn, if the chain at the inside runs slower than on the outside. If the Earth describes an orbit around the sun. then this circumstance has to do nothing at all with centrifugal force or with a force of attraction of the sun. The circular motion simply and solely is a result of the field influence of the sun[<iii>].

The force idea proves to be a pure auxiliary description. In the context of Newtonian mechanics the force plays a central role. Without question it is a very efficient and subjective perceptible description, which still isn't able to reproduce the physical reality in an objective manner. What keeps the planets into their orbit is only the field of the sun, which we call gravitational field and not some force! But of which kind is the gravitation and the field, which causes masses to come closer together and following our subjective observation attract each other (fig. 28.6 B)?

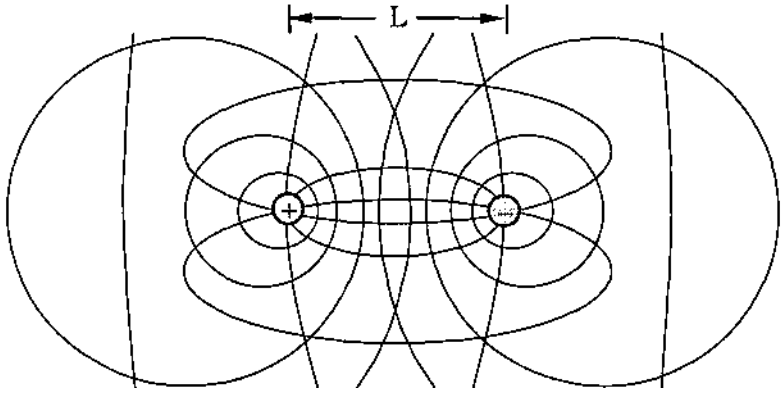
<i>: O. E. Rossler: Endophysics, the World as an Interface, World Scientific Publishing Co. 1998, Kap. 10, S. 87-112, mit Ubersetzungen aus <ii>:

<ii>: R. J. Boscovich: De spatio et tempore, ut a nobis cognoscuntur, 1755.

The length measure (the distance L between the spheres)<i> is determined by the field strength:

$$E, H \sim 1/L^2 \quad (28.18)$$

A. Charged mass points (electrons, positrons, ions,...):



B. Uncharged mass points (neutrons, atoms, ...):

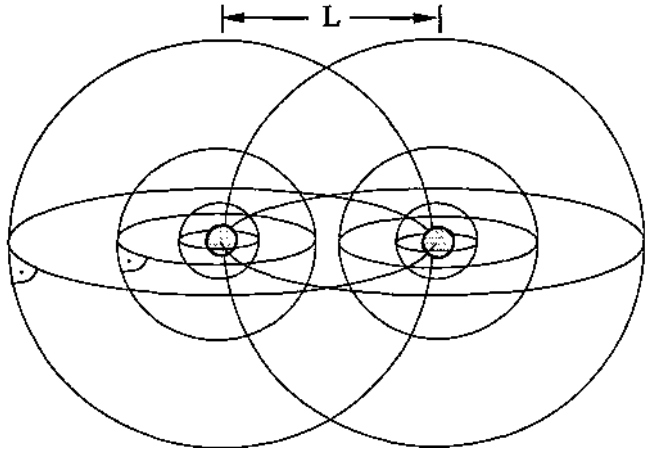


Fig. 28.7: Observation of a mutual force of attraction because of the effect of the fields on the distance measure.

<i>: Repetition of part 1, chapters 6.7 - 6.9 and part 2, chapters 10.4 and 15.2

28.7 Derivation of the gravitation

In fig. 28.6B the relation between the field influence and the observed force of attraction of two mass bodies is represented. If I in my mind for instance "switch on" the field lines of both bodies, which are placed at distance L, then the fields according to equation 28.18 reduce the measure L and optically come each other closer. With increasing proximity the field line density increases, so that L further decreases. We observe a mutual attraction, which lets both bodies move towards each other.

In fig. 28.7A the two bodies carry an electric charge. For different polarity the field lines as is well-known run from the positive pole to the negative pole, to bundle up there. As a matter of principle also here an attraction can be expected, which is called electromagnetic interaction. For the reason of the bundling up of the field lines this effect however will turn out to be considerably stronger. Hence the electromagnetic interaction is for many powers of ten more powerful than the gravitation.

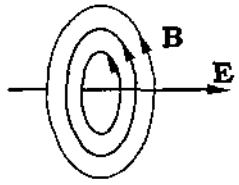
Furthermore there also can occur repulsion, if in the case of like charge the field lines are bent aside and between the two bodies an area is formed, where the field tends towards zero and the distance measure L (according to eq. 28.18) as a result towards infinity. The electromagnetic interaction theoretically indeed reaches to infinity. Responsible are the open field lines arising from a charged body.

Now every charged body in addition has a mass, with which it takes part in the gravitation. Let's remember the comparison of the derivations. The Maxwell theory teaches us that in the static case E- and H-field are decoupled, because each time the other field disappears. Even if as a result of the unipolar induction for every open field line the other one is taken to be standing perpendicular to the open field line, then this other line just wraps around the open field line and forms a closed-loop field line. In that way it can't be influenced anymore from the outside and can be neglected, so goes the doctrine, which is drawn from the Maxwell theory (fig. 27.5).

This is a fatal error in reasoning! The equation 28.19 naturally is valid for open field lines in the same manner as for closed ones. These fields also lead to an observable force of attraction. If of course exactly those fields are neglected, which are responsible for the gravitation, then we need not wonder, if we don't understand the gravitation and the nature of this interaction!

The influence of the closed field lines responsible for the gravitation is due to the missing bundling up of the lines correspondingly weak. Secondly these can't exist a force of repulsion due to the missing ability to influence closed field lines from the outside and third it can be recorded that all charged bodies also have a mass. All three statements of the field lines model perfectly cover the physical reality.
Fig. 28.7 B shows uncharged bodies, for which both the field lines of the E-field and of the perpendicular to them arranged H-field are closed-loop. Such bodies, like e.g. neutrons or whole atoms without charge behave electrically neutral to the outside, but have a mass for the reason of the closed field lines, whereby the field lines of the H-field dominate those of the E-field<i>.

<i>: Repetition of K. Meyl: EMEC part 1, chap. 6.8 + 6.9, part 2 chap. 15.1

Dual field approach	/ The Maxwell field
 **E** and **B** are coupled	**E** = neglectible, **B** = constant. / decoupled (approximation)
The closed field lines by no means are without influence: They cause the **gravitation** !	If the Maxwell field neglects the field factor, which leads to the gravitation, it isn't astonishing, if the gravitation remains not understood!

• The following physical standpoints can be distinguished:		
subjectivity (laboratory physics, observable)	**relativity** (mediator role) (transformation)	**objectivity** (not observable)
• Exemplary theories and their representatives:		
Newton Maxwell	Poincaré Einstein	Boscovich *(dual approach)*
• With the associated transformation:		
Galilei-transf. for c = ∞	Lorentz-transf. c = constant	*(new transf.)* c = variable

Fig. 28.8: Physical standpoints

28.8 From subjectivity to objectivity

With the field lines interpretation, which by the way already preferably was used by Faraday, the gravitation proves to be an until now neglected influence of the electromagnetic field. With that for the first time also the grand unification of the interactions was successful. The long sought-for unified theory with that for the first time comes within reach.
The derivation has made it possible to mathematically secure the theoretical working model of Boscovich. Already 1755 Boscovich points out the optical deception, which our observation underlies, if absolute orders of magnitude in our neighbourhood should change and our perception would change along. Then also all metric and optical measurement results would underlie this change. Following the idea of Boscovich I distinguish between subjectivity and objectivity.

The relativity is a compromise lying between both points of view, where a neutral standpoint is strived for, which lies outside the events. And from this standpoint the objectively taking place events are being observed. The theory of relativity consequently is a pure observer theory with strongly restricted scope on the basis of the Lorentz-transformation.

Theories of classic physics, like e.g. Newtonian mechanics, fall in the domain of subjectivity. The results and regularities are won in a terrestrial laboratory if possible isolated from the environment, where they have absolute validity. Here the Galilei-transformation is valid.
But if these subjectively won laws are applied to the microcosm in quantum physics or to the calculation of cosmic observations, one fast hits limits. The better the resolution of the microscopes and telescopes gets, the clearer the „outside" observer realizes, how much the laws of classic physics lose their validity.

Astrophysics successfully reaches for the theory of relativity, which with the curvature of space in the vicinity of mass centres delivers useful explanations. Here the dependence of the spatial dimensions on the field already could be established. In contradiction to that this fundamental relation is said to play no role whatsoever in quantum physics, or in all terrestrial laboratory experiments. But with which right may physical regularities from one domain be ignored in others? There only can exist one physics and that should be sought for!

What we need is objectivity! Behind all the apparently disconnected phenomena of physics work quite simple laws, which can't be observed and are until now not recognized by us. Objective physics in the words of Goethe is the one, which holds the world together in the heart of hearts. I call this, already by Boscovich suggested point of view, theory of objectivity. The access to the model domain of objectivity must be made mathematically by means of a transformation, since it is blocked for us by means of measurements or observations (see chapters 6.15-6.19). The transformation back into the observation domain must be made according to the same mathematical relations (fig. 28.9). In this way the quantum properties of the elementary particles can be calculated with high accuracy and agreement with the values, which until now only could be measured (chapter 7).

Approach: $r = c \cdot t$ (determine distance by signal prop. time) (27.23)

$dr = c \cdot dt + t \cdot dc$ (total differential for a change) (27.24)

$$c = \frac{dr}{dt} - t \cdot \frac{dc}{dt} \quad \text{resp.} \quad t = \frac{dr}{dc} - c \cdot \frac{dt}{dc} \qquad (27.25)$$

$$c = \frac{dr}{dt} - t \cdot \frac{d^2r}{dt^2} + t^2 \cdot \frac{d^3r}{dt^3} - t^3 \cdot \frac{d^4r}{dt^4} + t^4 \cdot \frac{d^5r}{dt^5} - \ldots \qquad (27.26)$$

resp.

$$t = \frac{dr}{dc} - c \cdot \frac{d^2r}{dc^2} + c^2 \cdot \frac{d^3r}{dc^3} - c^3 \cdot \frac{d^4r}{dc^4} + c^4 \cdot \frac{d^5r}{dc^5} - \ldots \qquad (27.27)$$

The Taylor-series (27.26 and 27.27) breaks off after the first term, if

c = constant	resp.	t = constant
$dr = c \cdot dt$	resp.:	$dr = t \cdot dc$
$\Delta r = c \cdot \Delta t$	resp.:	$\Delta r = t \cdot \Delta c$ (27.28)
theory of relativity		theory of objectivity
$\Delta r \sim \Delta t$	resp.:	$\Delta r \sim \Delta c$ means:
from: length contraction		variable speed of light
follows: time dilatation		dependency of meter measure
for absolute speed of the light		for absolute time
observation domain (measurable)		model domain (can only be calculated)

x(r) ○——● M{x(r)}

Model transformation of the length measures

Fig. 28.9:____ Theory of relativity and theory of objectivity and the model transformation between both physical standpoints

---

<i>: Repetition of part 1, fig. 6.16

28.9 The objective standpoint

The question is asked how one gets to an objective physical standpoint, which in addition evades every observation? The way leads over a transformation, to which all perceptible and measurable relations must be submitted.
If we for instance measure the distance r to a point light source, then the propagation of the light c and the propagation time t determine the distance measure $r = c*t$
If there occurs a little change of the distance, then two causes should be considered: Either the propagation time or the speed of light have changed somewhat. With that the two possible standpoints already would have been found.

The relativistic standpoint, which proceeds from the assumption of the speed of light being constant, says: the propagation time varies and we are dealing with a clock problem. If namely for relativistic velocities a length contraction occurs, then from that necessarily follows a time dilatation.
But actually no specific statement can be made about the constancy of the speed of light, besides that we look at, measure and scan everything with c and hence only observe the constancy. With that the theory of relativity remains a pure observer theory, exactly as Einstein originally called it into existence. This standpoint follows the motto: What can't be observed also doesn't need to interest the physicist.

The objective standpoint strives for more, for a description of the actually taking place processes. This time we proceed from the assumption of a universal and constant time with the argument: The time measure is an immutable definition and the physicist, who dictates this, himself determines what is simultaneousness. Then there also is no place for time travel and for clocks going wrong.
Therefore the speed of light can take all possible values always in strict proportionality to the length measures. Thus the measured length and distance measures should be transformed and that in the end is the unit „meter", which should be replaced by an objective measure.

With that the necessary transformation for variable c would be outlined. This transformation will be enqueued in the file of the big transformations. From it the Lorentz-transformation for c = constant emerges as a special case, like already from that transformation the Galilei-transformation follows for $c = \infty$. How now the relation of the subjective to the objective „meter" should be determined; by means of the relation of the relevant fields (eq. 28.17) or by means of the square root of Lorentz (eq. 28.16), over that should be worked and spoken. We already have successfully gone through it in a concrete example (chapter 7).

Every theory is judged according to its expressiveness. Ending this chapter the statements and derivations hence again are compared. On the one hand the Maxwell theory and from that the theory of relativity can be derived from the new approach, on the other hand a long list follows, which can't be connected with the Maxwell equations, like e.g. the gravitation. For instance the neutrino and all other elementary particles with all their specific quantum properties are derived (chapter 7), free and easy fundamental laws result, like the law of conservation of energy, and even the temperature spills its until now kept secret (chapter 8.3). Remains the conclusion: With no other approach according to the textbooks until now the efficiency of the new approach could be obtained.

• From the dual field-theoretical approach are derived:	• From Maxwell's field equations can be derived:
=> Maxwell's field equations	=>0
=> Quantum properties of the elementary particles	=>0
=> Neutrino (as an oscillating ring-like vortex)	=> 0
=> Gravitation (as a result of closed field lines)	= > 0
=> Unified theory (grand unification of all interactions)	=>0
=> Temperature (as an oscillation of size depending on field)	=>0
=> Law of conservation of energy (and many other fundamental laws of physics)	=>0
=> Theory of objectivity	=> Theory of relativity

Fig. 28.10: Comparison of the efficiency of the approaches (final balance)

29. Mathematical gleanings

If, proceeding from the new field-physical approach, well-known and accepted theories are derived as special cases, this on the one hand can be valued as evidence for the correctness of the approach. On the other hand the new approach in part significantly influences the interpretation of the derived theories. That can involve a rethinking, with which not insightful people have difficulties, if for instance quantum physics, thermodynamics or the gravitation become partial aspects of electromagnetism. Over and above that are hidden many new thing in the new approach, which are there to discover. To that are counting among others the potential vortices and the scalar waves. One can work out these phenomena physically or mathematically, where the latter way as a rule is the faster one. Hence the summary shall be concluded with a kind of mathematical gleanings.

29.1 General and special theory of relativity

Albert Einstein distinguishes between general and special theory of relativity. Whereas the special (SRT), still is linked tightly with the prerequisites of the Lorentz-transformation, the general (GRT), deals with an extension to arbitrary systems, which mustn't be inertial systems. I would like not to dwell upon the GRT, as Einstein designed it, and merely notice that every generalization represents a possible source of errors and has to be well founded.

In the case of our derivation, the general case as it were resulted of its own accord. Let's turn back: If the root of Lorentz still was a component of the derived field dilatation (28.15) and equally of the length contraction (28.16), then it fell out in the comparison of both results (28.17). With that the important result, the proportionality (28.18), which among others results in the gravitation, becomes independent of the speed of light and the relative velocity v. This last step is obvious and still completely new. It cannot be found at Einstein, who in another way finds his GRT and his description of the gravitation. Even if here is striven for the same goal, then deviations in the result cannot be excluded because of the differences in the derivation, for which reason I additionally mark the by me derived general relativity (GRT'), to avoid confusion.

Influence of the Lorentz-transformation in the:
SRT (special theory of relativity): one-dimensional,
GRT' (general theory of relativity): three-dimensional, to a large extent corresponding to the GRT of Albert Einstein,
GOT (general theory of objectivity)

Discussion of the root of Lorentz $\sqrt{1 - v^2/c^2} = \sqrt{1 - \beta^2}$ with $\beta = v/c$
resp. the γ-factor: $\gamma = 1/\sqrt{1 - v^2/c^2}$ (29.1)

Being transformed are:		SRT	GRT'	GOT
Length measures (length contraction eq. 28.16)	L [m]	$\sim 1/\gamma$	$\sim 1/\gamma$	$\sim 1/\gamma$
Areas (circular motion)	A [m²]	$\sim 1/\gamma$	$\sim 1/\gamma^2$	$\sim 1/\gamma^2$
Volumes (vortical motion)	V [m³]	$\sim 1/\gamma$	$\sim 1/\gamma^3$	$\sim 1/\gamma^3$
Time measures	t [s]	$\sim 1/\gamma$	$\sim 1/\gamma$	= const.
Velocities	v [m/s]	= const.	= const.	$\sim 1/\gamma$
(v = L/t)	c [m/s]	= const.	= const.	$\sim 1/\gamma$
Constants of material	ε [As/Vm]	= const.	= const.	$\sim \gamma$
($\varepsilon \cdot \mu = 1/c^2$)	μ [Vs/Am]	= const.	= const.	$\sim \gamma$
Relativistic mass (increase in mass)	m [kg] [=VAs³/m²]	$\sim \gamma$	$\sim \gamma$	$\sim \gamma^2$
Energy	W [VAs]	$\sim \gamma$	$\sim \gamma$	= const.
Energy density (w = W/V)	w [VAs/m³]	$\sim \gamma^2$	$\sim \gamma^4$	$\sim \gamma^3$
E-, **H**-field strength	**E** [V/m]	$\sim \gamma$	$\sim \gamma^2$	$\sim \gamma$
($w = (\varepsilon \cdot E^2 + \mu \cdot H^2)/2$)	**H** [A/m]	$\sim \gamma$	$\sim \gamma^2$	$\sim \gamma$
Power density (Poynting vector **p** = **E** x **H**)	**p** [VA/m²]	$\sim \gamma^2$	$\sim \gamma^4$	$\sim \gamma^2$
D-field, **B**-field	**D** [As/m²]	$\sim \gamma$	$\sim \gamma^2$	$\sim \gamma^2$
(**D** = ε·**E** ; **B** = μ·**H**)	**B** [Vs/m²]	$\sim \gamma$	$\sim \gamma^2$	$\sim \gamma^2$
Power	P [VA]	$\sim \gamma$	$\sim \gamma^2$	= const.

Fig. 29.2 Transformation table between SRT, GRT' and GOT

29.2 Transformation table

Let's speak again about the difference to the special relativity (SRT). This so to speak deals with the one-dimensional case of the uniform motion of a reference system in x-direction ($v = v_x$), as specified by the Lorentz-transformation, where only the x-components and not those in y- or z-direction are being transformed. As already mentioned this is a purely theoretical case, which in practice occurs next to never. Normal is circular and vortical and with that accelerated motion, where the velocity component permanently changes its direction.

The derived result of the general relativity (GRT') does justice to this circumstance. Even if this at first only has been derived for the x-direction it nevertheless is valid equally in y- and z-direction. It even remains valid for the case that we base on a path of arbitrary form of a spatial field vortex. In this case some components continually occur in all directions of space, so that the relative velocity v as already the speed of light c loses its vectorial nature. With that the transition of the SRT to the GRT is carried out.
By means of the spatial swirling the electric and magnetic field pointers at the same time turn into scalar factors, by taking over the function of the aether. Let us remember that even Einstein in his GRT was forced to again introduce the aether, which in the SRT still was unnecessary.

It therefore makes a difference in the transformation of physical factors, if we base on a one-dimensional (SRT) or a three-dimensional spatial description (GRT). Length measures in x-direction in both cases must be converted using the root of Lorentz. Usually the relativistic γ-factor is introduced, which is inverse to the root of Lorentz

$$\gamma = 1/\sqrt{1-v^2/c^2) \qquad \text{with } x_o/x = \gamma \quad (29.2)$$

If thus individual length measures would be subject to a length contraction following the γ -factor, then a volume V according to the SRT must be transformed with γ, according to the GRT' however with γ^3.
As is well-known a relativistic increase in mass is converted with the γ-factor and in the same manner the to that proportional energy $E = m\,c^2$. If we however correlate the energy to the volume V and in that way determine an energy density w, then the difference between SRT $(w \sim \gamma^2)$ and GRT' $(w \sim \gamma^4)$ again has its maximum effect.
A relation to the field factors of E- and H-field is for instance provided by the energy densitv of a wave field

$$w = (\varepsilon \cdot E^2 + \mu \cdot H^2)/2 \quad (29.3)$$

According to that the field strengths in the one-dimensional case of the SRT should be converted with the γ-factor, in the case of the GRT' however with γ^2, in accordance with the derivation in chapter 28. This circumstance willingly is overlooked, although it only concerns the textbooks and the today valid theory of relativity. I however point to the difference, since it does make a difference if we start with the SRT or the GRT when we change to the general theory of objectivity (GOT).

In the domain of the GOT all length measures should be transformed. The respective dimension gives information with which power the γ-factor occurs (fig. 29.2). The unit meter is responsible for that.

Discussing the root of Lorentz: $\sqrt{1-\beta^2} = 1/\gamma = \sqrt{1-(v^2/c^2)}$

mathematical consideration:	$v = 0$	$v < c$	$v = c$	$v > c$
Abbreviations: $\beta = v/c$	$0 <$	$\beta < 1$	$\beta = 1$	$\beta > 1$
and: $\gamma = 1/\sqrt{1-\beta^2}$	$1 <$	$\lvert\gamma\rvert < \infty$	$\gamma = \pm\infty$	imaginary
and: $\gamma^2 = 1/(1-\beta^2)$	1	positive	$\gamma = +\infty$	negative
and: $\gamma^4 = 1/(1-\beta^2)^2$	$1 <$	positive	$\gamma = +\infty$	positive
Examples: Increase in mass, energy ~ γ for SRT and GRT	1	positive	$\pm\infty$	complex
Field strength in GRT': $\mathbf{E}, \mathbf{H} \sim \gamma^2$ and mass in GOT: $m \sim \gamma^2$	$1 <$	$\mathbf{E}, \mathbf{H} < \infty$ positive	$+\infty$	$\mathbf{E}, \mathbf{H} < 0$ negative
Energy-, power density ~ γ^4 (Poynting vector) in GRT:	$1 <$	$\mathbf{P} < \infty$ positive	$\mathbf{P} = +\infty$	$\mathbf{P} < \infty$ positive

Fig. 29.3 Discussion concerning the root of Lorentz

- The special theory of relativity SKT only is defined for $v < c$
- For $v \bullet c$ particles with a complex mass, but with a real energy density (according to GRT') would result.
- From the point of view of the theory of objectivity (GOT) the mass should be taken negative-real (neutrino?).

29.3 Discussion concerning the root of Lorentz

Fig. 29.2 forms the basis for the transformation in the domain of the GOT, the general theory of objectivity, where it plays a role, if a subjectively measured factor should be converted from the laboratory domain or a relativistic factor according to the SRT or the GRT'. The given proportionalities thereby should be put in the respective relation. In this way results the respective valid instruction for transformation on the basis of the root of Lorentz.

Let's take a critical look at the root of Lorentz. The velocity v occurring in it, of whatever this may consist, is depending on the field according to equation 28.14 + 28.15. It strictly speaking wouldn't be constant anymore and wouldn't belong in a general instruction for transformation at all. Only, what is valid for v, is valid to the same extent for c. Since only the proportion of v/c occurs in the root of Lorentz every influence depending on field or of other nature will have no effect on v/c and the value of the root of Lorentz. It in any case will retain its value. It fulfills for itself the condition of the Lorentz invariance. According to that in the case of the relative velocity v it doesn't depend on the absolute value, but only on the relation to the speed of light. In addition the restriction to values of $v < c$ is normal, if the speed of light is seen as an upper limit. Let's first purely mathematically draw a case distinction for different velocity domains of v. For $v = 0$ the root of Lorentz becomes one and the Lorentz transformation turns into the Galilei transformation.

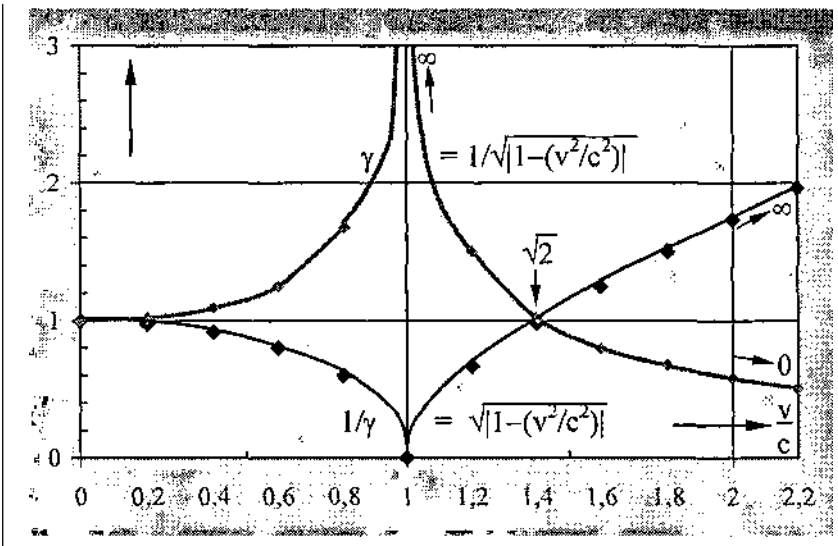
Connected to this is the today well-known and technically used domain up to the limit of $v = c$. It virtually is impossible to accelerate a mass particle to the speed of light, since mass, field and energy would grow towards infinity, as is clear from the table (fig. 29.2). Particles as fast as light, like photons, hence cannot have a mass. At $v = c$ a singularity is present.

In a field theory, which also deserves this name, however an upper limit must not be present. Hence also the case for $v > c$ should be required theoretically. Only later we will be able to judge if this makes sense physically. We at first only want to examine the case mathematically. Mass, field and energy now again have a finite value, there however results a complex, purely imaginary mass, a negative field and doing so, as already before a positive energy and power density.

There sometime has been the textbook opinion that it is physically impossible to fly faster than sound. This erroneous statement even could be proven „scientifically", because such a supersonic airplane would fly off the observation space and with that wouldn't be real anymore, thus from a mathematical viewpoint would be complex. Anyone, who in New York gets off a Concorde, can confirm that everything at any moment of the flight was real. Only the observer is deceived, if the airplane flies somewhere else, than he perceives it. Is the speed of light also such a „sonic barrier", which by the majority of the scientists since Einstein until today still is thought to be insurmountable?

How should one physically imagine a complex mass? Let us remember the alternating current teachings, where it is normal to work with complex values, since the mean values of the oscillating alternating currents, tension voltages and fields are zero. Calculating with mean values would result in zero energy and power. Hence complex factors are introduced and the root mean square values are calculated and measured instead of the mean values. Could a complex mass analogously not concern an oscillating particle, a particle, which in addition is faster than the light?

- Physical example: _____
  neutrino = mean of the oscillating mass≈zero
  RMS value of the complex mass≠zero
  E- and H-field with inverse sign
  carrier of positive energy and power
  ν -model: ring-like vortex oscillating from e^- to e^+ <i>



Examples from the general theory of relativity (GRT):

(28.16): length contraction $L \sim 1/\gamma = \sqrt{1-(v^2/c^2)}$

(6.19): increase in mass $m \sim \gamma = 1/\sqrt{1-(v^2/c^2)}$

(6.6,28.15) field dilatation $\mathbf{E} \sim \mathbf{H} \sim \gamma^2 = 1/(1-v^2/c^2)$

Fig. 29.4: Root of Lorentz for speeds faster than light (v > c)

29.4 Mathematical derivation of the neutrino

In the domain of speeds faster than light, for $v > c$, the power series (28.12) does not converge anymore and every observer theory and every observation (fig. 28.4) will fail, because particles faster than light run away of their own visible appearances. Every measurement and every observation inevitably is behind and hardly can be assigned to the actual cause. That way for instance measured neutrino events are being connected with celestial observations, with which they haven't got anything to do at all.
If we however describe the domain $v > c$ in the complex plane, then astonishing results are found, which could be verified physically: a complex length dilatation with increasing velocity goes along with a loss of complex mass. The oscillating fields, energy and power density however would be real with negative sign.
Thus there would result particles carrying energy with an oppositely poled field, with an oscillating mass and if necessary also an oscillating charge. Without static mass and charge these particles hardly would interact with normal matter, which leads to an enormous ability of penetration. The only physical particles, which have such a property, are the neutrinos. With that a usable and an extremely efficient model description has been found for these particles. Also the energy of these particles can be calculated, which has considerable orders of magnitude and is available as an energy source everywhere and any time.

If for instance in a converter for space energy a neutrino should be converted into a resting charge carrier (with $v = 0$), then two steps are necessary (see part 2 of this series of books):

1. First the neutrino must be slowed down to 1.414 times the speed of light (fig. 28.9). Doing so energy is spent and not won! The converter for instance can cool down.

2. Afterwards the characteristic rotation of its own, with which the ring-like vortex spins around itself by permanently putting its inside to the outside and vice versa, has to be taken away from the neutrino. In that way the vortex centre is closed and the particle acquires localization. It becomes a charge carrier.

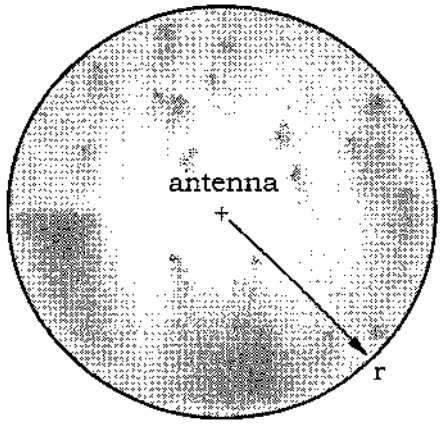
Even if the representation in the complex plane represents only an auxiliary description, the model nevertheless seems to be efficient, because despite its complex mass and charge the neutrino nevertheless carries a real energy. It in any case is represented in that way to an observer, who measures the relation with the speed of light, who in the relativistic scheme of things scans the relation.

Today, as already said, even the sonic barrier has become permeable and no scientist dares to physically deny this fact and even prove his mistake mathematically anymore. No, on the contrary, he always did know that as an expected consequence the sonic barrier runs after the supersonic plane. The once physically unthinkable and scientifically fought has become normality.
What should hinder an oscillating particle, like a neutrino, to be faster than the light? Some time one also will accustom to that.

- Starting-point:
  the fundamental field equation
  (derivation in chapter 27.10)

$$-c^2 \cdot \mathrm{rot}\,\mathrm{rot}\,\mathbf{B} = \frac{\partial^2 \mathbf{B}}{\partial t^2} + \frac{1}{\tau_1}\frac{\partial \mathbf{B}}{\partial t} + \frac{1}{\tau_2}\frac{\partial \mathbf{B}}{\partial t} + \frac{\mathbf{B}}{\tau_1 \tau_2} \quad (27.26)$$

- Example:



Spherical propagation of an electromagnetic wave in space

- The number π: $\pi = 3.14159$

straight	(π·)	circular		spherical
r	· π·2 =	2r·π	· 2r =	π·r²·4
line		circum-ference		surface
r	· π·r =	r²·π	· r·4/3 =	π·r³·4/3
line		area		volume

(29.4)

Fig. 29.5: The number π

29.5 Universal constants and constants of nature

Strictly speaking fundamental or universal constants can't exist in pure field physics at all. For the example of the speed of light has been shown that it merely are measurement constants (fig. 6.11). The numerical size is a consequence of the definition. The speed of light for instance has the today well-known value as a consequence of the fixing of a length unit and a time unit. If we change a unit, if we take ,,feet" instead of ,.meters", then another value results. If however the velocity changes, then the reference measure of our gauge changes along and we get the identical reading.
Electric and magnetic field constant depend directly on the speed of light c $(\varepsilon \cdot \mu = 1/c^2)$, which solely by the fixing of the electric units takes a certain value.
The inner structure of the potential vortices leads from Planck's quantum of action, to the elementary charge and to the countless atomic ,,constants", which all objectively seen aren't constants at all. They virtually all can be derived (chapter 7).

Sooner or later even the last natural scientist will realize, that nature does not provide "constants" at all. If ,,constants of nature"' did exist, as listed in textbooks and encyclopaedias, then they aren't consistent with causality, since we don't know the cause, why the factor should have exactly this size and no other. Behind every so-called constant of nature unnoticed is hiding a physical closed loop conclusion.

Fundamental constants only exist in mathematics. This can be shown very nicely for the example of the ,,fundamental field equation" (eq. 27.26), which has been derived from the new field theoretical approach (fig. 27.10). It is the description of waves and vortices in space and time, which indeed carries features of a ,,world equation". If one searches this equation for fundamental constants, then one altogether can find three: the number π, the number e and the Golden Proportion Φ. The speed of light c however occurs only as the mathematical factor characterizing the wave as a result of the defined units. If one would choose the units different, c as well could be made 1. With the fundamental numbers that procedure won't work. They don't depend on the definition of the units!

Let's consider the number π. The number π occurs every time as a proportionality factor if we transition from a straight line to a circle or further to a sphere, from a line to the circumference or further to the surface of a sphere and exactly so from a line to the area of a circle or further to the volume of a sphere. Since for all the special cases, which are derived from the fundamental field equation (the structure of the elementary particles, the atomic structure and in the same way again in the universe), the spherical symmetry dominates, the mathematical solution is determined by a corresponding spatial configuration of the number π. It has its cause neither in a physical relation of interactions, nor in the choice of the units, but only in the geometry.

The number e:

$$e = \lim_{n \to \infty} (1 + 1/n)^n = 2.71828 \qquad (29.5)$$

for n = 2 is $(1+1/n)^n = 1.5^2 = 2.25$
for n = 1 is $(1+1/n)^n = 2^1 = 2$
for n = 0.5 is $(1+1/n)^n = \sqrt{3} = 1.73$
for n = 0 is $(1+1/n)^n = \infty^0 = 1$
for n = -0.25 is $(1+1/n)^n = 1/(-3)^{0.25}$ gives a complex solution!
for n = -0.5 is $(1+1/n)^n = 1/\sqrt{-1} = -i$, thus again complex!
for n = -0.75 is $(1+1/n)^n = 1/(-3)^{0.75}$ as well complex!
for n = -1 is $(1+1/n)^n = 1/0 = \pm\infty$
for n = -2 is $(1+1/n)^n = 2^2 = 4$

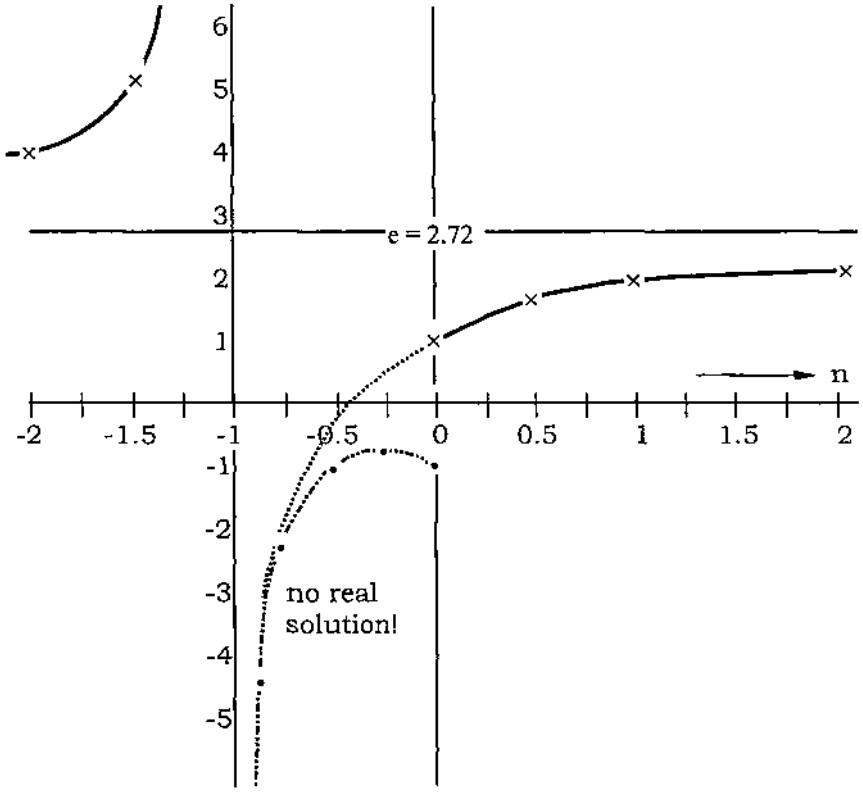


Fig. 29.6: Forming the limiting value of the number e

29.6 The fundamental number e

In the fundamental field equation (27.26) a further irrational number is concealed, the number e. Whereas the left side of the equation (a) gives the spatial distribution, the right side (b-e) describes the temporal course of events. Besides the term constant in time (e) also first time derivations (c and d) and a second time derivation (b) occur. For a solution of this differential equation a function should be found, the derivations of which are again the function itself. This condition strictly speaking is fulfilled only by one single function, the e-function.
We used this property of the e-function already for the derivation of the Schrodinger-equation in chapter 5.6 and 5.7. There with the help of the e-function an approach was chosen, which leads to the well-known solutions of the Schrodinger-equation, which are considered to be secured experimentally. With that the number e controls the temporal relations of the fundamental field equation.

It might be helpful to take a closer look at the origin of the number e. It results from a consideration of limiting values:

$$e = \lim_{n \to \infty} (1 + 1/n)^n = 2.71828 \qquad (29.5)$$

If one varies n and allows different values between $-\infty$ and $+\infty$, then a strange behaviour is showing. One indeed more and more approaches the well-known value of e = 2.72, as dictated by the definition of limiting values according to equation (29.5), the larger n is chosen. But in the opposite direction it looks less tidied:

	for	$n = 1$	is	$(1+1/n)^n$	=	2^1	=	2
	for	$n = 0{,}5$	is	$(1+1/n)^n$	=	$\sqrt{3}$	=	1.73
	for	$n = 0$	is	$(1+1/n)^n$	=	∞^0	=	1
	for	$n = -0.5$	is	$(1+1/n)^n$	=	$1/\sqrt{-1}$	=	$-i$, thus complex!
and	for	$n = -1$	is	$(1+1/n)^n$	=	$1/0$	=	$\pm\infty$

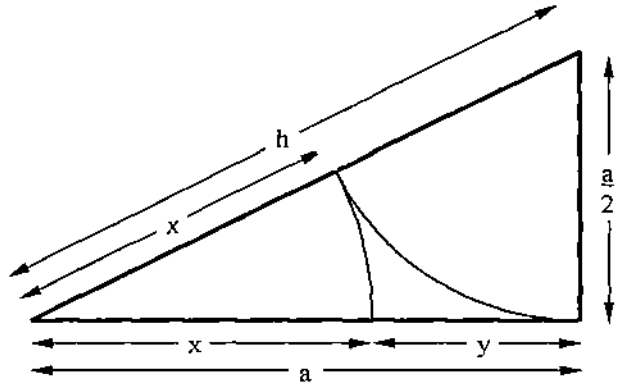
(29.6)

Since the e-function inside the fundamental field equation is responsible for the temporal sequence, the interpretation of my colleague Prof. Dr. Preussker<i> gets a deeper sense. He says, it starts outside our imagination (at n = -1). Afterwards at first big chaos prevails. Mathematically seen some imaginary solutions arise. Finally the system is putting in order (from n = 0), to more and more approach the value e = 2.72 .

The number e is of fundamental importance and thereby holds unforeseen secrets. More mysterious and until now entirely misunderstood is the meaning of the Golden Proportion. Also this indivisible number can be found in the fundamental field equation. Since it is less known and more complicated to handle, it first shall be introduced.

<i>: H. Preussker: Der Wirbelring, Halstenbeck 2002

Graphical construction at a right-angled triangle (Pythagoras):



Golden Proportion of length $a = x + y$: $\frac{x}{a} = \frac{y}{x}$

with the proportion:

$$\frac{x}{a} = \Phi = 0.618 \quad (29.9) \qquad \text{and} \qquad \frac{a}{x} = \frac{1}{\Phi} = \Phi + 1 = 1.618 \quad (29.10)$$

The pentacle

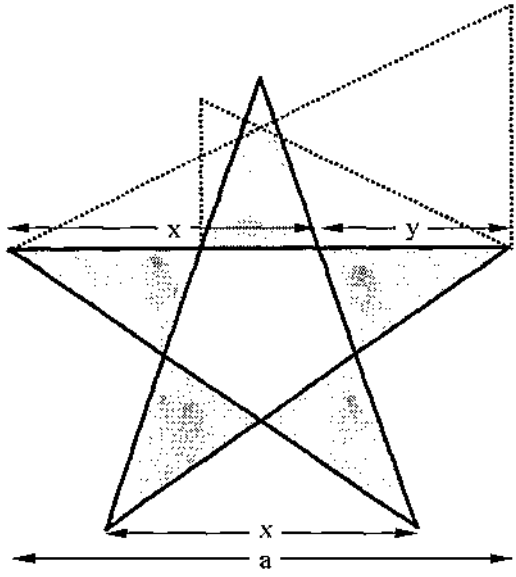


Fig. 29.7: Constructions for the Golden Proportion

29.7 The pentacle

During his visit of the Egyptian pyramids already two and a half thousand years ago the history writer Herodotus by his guide had been called attention to the circumstance that the Golden Proportion has been realized for the proportions of scale.
In the case of the pyramid of Cheops it even has been taken into account manifold, as we know today, but we hence still don't know why. There must be an intention behind it. Anyway a coincidental use can be eliminated, since the Golden Proportion cannot be handled in an easy way, neither graphically nor mathematically.
The Golden Proportion in addition plays an important role in the whole ancient architecture and not only there. It for instance occurs in the case of a very old symbol, the five edged star, which we can draw with one line without taking off. The well-known symbol also is called pentacle.

In the case of the Golden Proportion a straight line a is divided into two unequal halves. The larger half x thereby is 61.8 % of the straight line a. Already Pythagoras has researched and teached about this. Maybe he did know more about the purpose of this classification than all the mathematicians, archaeologists and art historians of today together.
For a graphical solution we assume a right-angled triangle. The task is to divide one leg of length a = x + y according to the Golden Proportion into two parts, the larger part x and the smaller part y. The second leg has the length a/2. According to the theorem of Pythagoras the length of the hypotenuse h is

$$h = \sqrt{a^2 + (a/2)^2} = (a/2)\sqrt{5} \quad (29.7)$$

If the length of the second leg (a/2) is subtracted from the hypotenuse, then this is the sought length x = h – a/2:

$$x = (a/2)(\sqrt{5} - 1) \quad (29.8)$$

The proportion of both length measures gives the constant Φ, which is characteristic for the Golden Proportion:

$$\Phi = x/a = (\sqrt{5} - 1)/2 = 0.618 \quad (29.9)$$

This proportional number has a special property. If one adds 1 to the number and forms the reciprocal value of that, then the same number comes out again, thus:
with $\Phi = x/a$: with $a = x + y$:

$$\Phi + 1 = \frac{1}{\Phi} \quad \text{and} \quad \frac{x}{a} + 1 = \frac{a}{x} \quad \text{resp.} \quad \frac{x}{a} + 1 = \frac{a - x}{x} = \frac{y}{x} \quad (29.10)$$

With that the ratio of the length a and the larger section x is the same as the ratio of x and the smaller section y.

- Starting-point: the fundamental field equation

$$-c^2 \cdot \mathrm{rot}\,\mathrm{rot}\,\mathbf{E} = \frac{\partial^2 \mathbf{E}}{\partial t^2} + \frac{1}{\tau_1}\frac{\partial \mathbf{E}}{\partial t} + \frac{1}{\tau_2}\frac{\partial \mathbf{E}}{\partial t} + \frac{\mathbf{E}}{\tau_1 \tau_2} \qquad (27.26)$$

- for the special case: because of missing conductivity ($\sigma = 0$)
  e.g. in air no eddy current damping: $\sigma/\varepsilon = (1/\tau_1) = 0$
- and no currents (eq. 27.15+27.16): $\mathbf{j} = \sigma \cdot \mathbf{E} = -\mathbf{v} \cdot \varepsilon \cdot \mathrm{div}\,\mathbf{E} = 0$
- resp. $\Delta \mathbf{E} = \mathrm{grad}\,\mathrm{div}\,\mathbf{E} - \mathrm{rot}\,\mathrm{rot}\,\mathbf{E} = -\mathrm{rot}\,\mathrm{rot}\,\mathbf{E}$

$$\Rightarrow \quad c^2 \cdot \Delta \mathbf{E} = \frac{\partial^2 \mathbf{E}}{\partial t^2} + \frac{1}{\tau_2}\frac{\partial \mathbf{E}}{\partial t} \qquad (29.11)$$

Standard case of a wave damped with potential vortices

In the case of a perturbation this wave rolls up to a vortex, with

- the vortex radius r
- the swirl velocity $c = \omega \cdot r$
- the angular velocity $\omega = 1/\tau_2 = c/r$

The vortex itself runs with the velocity $v(x(t)) = dx/dt$
as a longitudinal wave in direction of the **E**-field: $\Delta \mathbf{E} = \partial^2 \mathbf{E}/\partial x^2$

$$\Rightarrow \quad \partial \mathbf{E}/\partial t = (\partial \mathbf{E}/\partial x) \cdot (dx/dt) = v \cdot \partial \mathbf{E}/\partial x \quad \text{and}$$
$$\partial^2 \mathbf{E}/\partial t^2 = v^2 \cdot (\partial^2 \mathbf{E}/\partial x^2);\ (\partial v/\partial t = 0, \text{ since not accelerated})$$

$$\Rightarrow \quad c^2 \cdot \partial^2 \mathbf{E}/\partial x^2 = v^2 \cdot (\partial^2 \mathbf{E}/\partial x^2) + v \cdot (c/r) \cdot \partial \mathbf{E}/\partial x \qquad (29.12)$$

- with the exponential approach: $\mathbf{E} = \Psi \cdot e^{-x/r}$ are:

$$\Rightarrow \quad \partial \mathbf{E}/\partial x = -(1/r) \cdot \mathbf{E} \quad \text{and} \quad \partial^2 \mathbf{E}/\partial x^2 = (1/r^2) \cdot \mathbf{E}$$

$$\Rightarrow \quad (c^2/r^2) \cdot \mathbf{E} = (v^2/r^2) \cdot \mathbf{E} - (v \cdot c/r^2) \cdot \mathbf{E} \qquad (29.13)$$

- resp.: $c^2 = v^2 - v \cdot c$ (29.14)

Fig. 29.8: The calculation of an electromagnetic wave, which is rolling up to a potential vortex.

The big mystery concerning the harmony of the Golden Proportion gets a sober technical-physical dimension with the theory of objectivity. It determines within the fundamental field equation" (27.26) the rolling up of a wave into a vortex and vice versa. The Golden Proportion mathematically describes the process known as wave damping, as we can make ourselves clear.

29.8 The vortex, which is rolling up

For the case of a wave propagation in air or in vacuum, if no electric conductivity is present ($\sigma = 0$), the fundamental field equation is reduced to the two parts: the description of the electromagnetic wave and the potential vortex as a damping term. Now a solution of this partial differential equation (29.11) is sought. This only succeeds for a very particular course of spatial and temporal field.

If a wave for a field perturbation rolls up to a vortex, which we had worked out as a model concept, then the field oscillation continues to run with the speed of light, but this time in circles. With this consideration the relation between the angular velocity resp. the time constants and the radius of the circular vortex has been described ($\tau_2 = r/c$).

$v(x(t)) = dx/dt$ is the not-accelerated velocity of propagation of a vortex. In that case v points in the x-direction radially to the outside. For the time derivation of the field vector $E(x(t))$ the chain rule should be applied. With that the field equation (29.11), defined in space and time, can be converted into an equation determined in v and x (29.12).

Finally we use the mentioned property of the e-function, which for first and second derivation again turns into itself, by choosing the approach of an exponential damping with $e^{-x/r}$ There remains a quadratic equation to determine the velocity v (29.14 and 29.15). From the two solutions of the quadratic equation only the one with positive velocity should be considered (29.17) and that would be 1.618 times the speed of light! (29.18).
If we subtract 1 from this value or form the reciprocal value, then in both cases the factor $\Phi = 0.618$ results, which is called the Golden Proportion (29.19).

Behind this clear, mathematically won result is hiding a deeper physical meaning. Obviously nothing can hinder a longitudinal wave and its vortices to be slower or faster than just with v = 1.618*c. Let us take the case that v = c, for which there even exist calculations in some textbooks<i>. Then as a result gets out that the longitudinal parts decrease very quickly and already can be neglected after $\lambda/2\pi$. I in any case interpret the near-field zone of an antenna (fig. 29.9) such that within one sixth of the wavelength the vortices to a large extent have decayed.

<i>: Zinke, Brunswig: Lehrbuch der Hochfrequenztechnik, 1. Bd., 3.Aufl. Springer-Verlag Berlin 1986, Seite 335

- The quadratic equation 29.14: $v^2 - v \cdot c - c^2 = 0$ (29.15)
- has the solution: $v = c/2 \pm \sqrt{c^2/4 + c^2}$ (29.16)
- for the proportion v/c: $v/c = (1 + \sqrt{5})/2 = 1.618$ (29.17)
- The result v/c = 1.618 (29.18)
- resp.: c/v = Φ = 0.618 = „Golden Proportion"(29.19)
- acc. to that is: 1 + Φ= 1.618= 1/Φ= 1/0.618(29.18*)

- Concerning the physical meaning of v/c = 1.618 (29.17)

In the domain:	vortex decay:	description:
v = c	within $\lambda/2\pi$	near-field zone
v < 1.618·c	only later	noise
v = 1.618·c	stability limit	direct conversion
v > 1.618·c	stable, no decay	neutrino radiation

=>In the ideal case at 1.618 times the speed of light at the stability limit, the natural and spontaneous conversion from vortex to wave and vice versa occurs.

=> Scalar wave antennas have their optimum degree of effectiveness in the Golden Proportion!

Fig. 29.9: ___ Derivation of the Golden Proportion from the fundamental field equation.

For larger velocities, as Tesla has produced already 100 years ago, the stability of the vortices, but also their biological effectiveness increases. From a high-frequency technical viewpoint this is the domain of the noise, the domain of instable oscillating noise vortices. From a biological and medical viewpoint especially here the answers should be sought to questions concerning the electromagnetic environmental compatibility.
This domain stretches from v = c to v = 1.618*c, the boundary case, where a spontaneous conversion of the wave into the vortex is possible. The Golden Proportion describes the stability limit, where the field vortices after they have been formed, don't decay anymore. From this velocity on the antenna resp. radiation source hasn't got a limited near-field zone anymore, since that now reaches to infinity. Only from this distinct velocity on I give the field vortices the name "neutrino".

29.9 The Golden Proportion

Whereas traditional antennas, which should emit electromagnetic waves, are optimized for signals with the speed of light, do scalar wave antennas have their optimum degree of effectiveness in the Golden Proportion. Thereby the goal of an emission of oscillating ring-like vortices is pursued. Vortices, which with a velocity of propagation of v = 1.618-c remain stable and make possible a spatially unlimited transmission of energy and information by scalar waves.

The velocity of propagation v is calculated from the product of wavelength times frequency. $v = \lambda \cdot f$. If the frequency of a transmitter is prescribed, then the geometry of the transmitting antenna decides on the degree of effectiveness of the antenna and on how many parts of transverse waves are emitted in relation to longitudinal waves. In the case of a broadcast antenna usually λ or $\lambda/2$ is chosen. For a scalar wave however the optimum is reached with

$$\lambda_{vortex} = 1.618 \cdot \lambda_{wave} = 1.618 \cdot c/f. \quad (29.20)$$

With that the electrotechnical problem becomes a geometrical one, if it concerns the use of scalar waves. Crucial is the antenna geometry, and the Golden Proportion provides the necessary constructional instruction. Were the buildings in antiquity, which were constructed according to the Golden Proportion, technical facilities for scalar waves<i>? Did the builders have physically explainable and mathematically provable guidelines? At this place, by the derivation of the Golden Proportion from the fundamental field equation, there arise completely new aspects for the judgement and interpretation of buildings especially from antiquity. If we have understood their way of functioning, then we will be able to learn much from that for our own future and for the future construction of scalar wave devices. Concluding the seminar we hence deal with antiquity.

ancient temple	=	short wave station
dedicated to one god	=	fixing of the frequency
supreme god Zeus, father of all gods	=	range of the short wave, all SW wave bands
priest, representative of the god	=	amateur radio operator, with licence to transmit
high priest	=	chief intendant
Pontifex Maximus, ,,topmost bridge builder"	=	chairman of the authority and the telegraph offices
oracle<i>	=	telegraphy receiver
runes, cuneiform writing	=	telegraphy symbols
metre, hexameter	=	increase of redundancy
oracle priest	=	telegraphy interpreter
tripod<ii>	=	reception key, electro-acoustical converter
looking at intestines, rite of sacrificing	=	reading off convulsions, electro-optical converter
temple books	=	news-notes
seer, who looks into the god world	=	amateur radio operator, at telegraphy reception
Homer	=	ancient radio reporter

Fig. 30.1: ____Little dictionary for ancient radio engineering (1).

<i>: Lamer: Worterbuch der Antike, Kroner Verl. Bd.96 under "oracle" stands: ,,Lat. oraculum = site of speaking; particularly: site, where a god speaks; then: that, what the god says". According to the encyclopaedia oracle priests inspired by a god ,,simply were frauds, who lived of the ignorance of the public".

30. Scalar wave technology in antiquity

The end of the book about potential vortices and their propagation as a scalar wave shall form an impressive example, where as many of the derived wave aspects as possible have an effect. It shall be proven that already in antiquity radio engineering based on scalar waves has been used. The proof starts with a thesis.

30.1 Thesis:

The temples in antiquity all were short wave broadcasting stations. And energy from the field served as an energy source, so e.g. the earth radiation in the case of temples of terrestrial gods. In the case of the solar god the radiation of the sun was used, whereas for the temples, which were dedicated to the planetary gods, the neutrino radiation arriving from the planets served as an energy source.

If the temple was dedicated to a particular god, then the name of the god was representing the used frequency of the broadcasting company. The corresponding wavelength, resp. the respective god, understandably was "immortal".

Not so the broadcasting technicians on duty, who as human beings naturally were mortal, who took turns in the studio as members of the priest council and who merely had to impersonate the god Apollo, Poseidon etc. by the name of the broadcasting company, if they went on air. Only for the news editor Homer and for few of his colleagues we actually know the names of the persons behind the scenes.

In the temple books the texts have been recorded, which a god and its broadcasting company have received. The chosen metre served the easier detection and correction of transmission errors.

Here often a lot of fantasy was necessary, for which reason the reception facilities commonly were described as oracle<i>. The reception of the news as a rule took place on an altar. Thereby the direct effect of scalar waves on man e.g. in the case of the so-called temple sleep or the indirect influence on biological systems, e.g. on the intestines of slaughtered animals, was evaluated.

A further development of the telegraphy was the tripod technology<ii>, in which case by turning of the polarization plane individual symbols and letters were transmitted up to the transmission of the spoken word with the help of a special wavelength modulation. That far the thesis reaches, which now should be proven.

<ii>: Lamer: Worterbuch der Antike, Kroner Verl. Bd.96 under "tripod" stands: „the tripod is a dedication gift to gods, a honorary gift for winners. That one pleased them with the gift of a cooking pot, is strange; one has tried to find the reason, but until now without success". In the encyclopaedia further is advised: „tripod as a means for spiritual insight?!"

godology	= high frequency technology
god name	= RDS, station identification
members of a family of gods	= broadcasting studios of a broadcasting company
Pantheon, temple of all gods	= extremely broadband FM broadcast station
crown	= antenna netting
gifts for sacrificing	= broadcasting fees
place of sacrificing	= place of a node of the standing wave
earth radiation	= power supply
homage of a weekday	= time restriction of the operation of the station
Zeus „forges" thunderbolts	= electrostatic blows, when a temple is oscillating
ritual act	= technical provision for transmission and reception
Pythia of Delphi<i>	= radio telephone operator, receptionist
Cella (marrow of temple)	= tuned cavity
obelisk<ii>	= antenna rod

Fig. 30.2: ____ Little dictionary for ancient radio engineering (2).

<i>: Lamer: Worterbuch der Antike, Kroner Verl. Bd.96, under „Pythia"(gr.=the asker): In the temple of Delphi was a chasm. A tripod was standing over it, on which the Pythia was seated, if she gave oracle. Comment: "It was flashy how odd the Pythia was sitting; inconveniently enough, on the cooking pot of the tripod. Ancient pictures, which show her that way, still weren't proven, that it was this way ..."

<ii>: Lamer: under „Obelisk" stands; „The obelisks probably were clocks".

30.2 Prerequisites

The argumentation has to be made on mathematical-physical foundation. The prerequisite for that are the 29 chapters of before. The following points could be demonstrated and derived:

1. The wave equation (inhomogeneous Laplace equation) describes the sum of two wave parts, where
2. every antenna emits both parts,
3. the transverse part, known as electromagnetic wave (Hertzian wave)
4. and the longitudinal part (Tesla radiation) termed scalar wave by the discoverer, better known as antenna noise.
5. The wave equation mathematically describes the connection of both wave parts in general and the conversion of one part into the other in particular, thus
6. the rolling up and unrolling of waves in field vortices (measurable as noise).
7. The transition takes place proportionally to the Golden Proportion, as resulted from the derivation (chapter 29.7 - 29.9)

With the last point the electrotechnical problem becomes a geometrical problem, if it concerns the use of scalar waves. The geometry of the antenna is crucial. Thereby the Golden Proportion provides the necessary direction for construction.
That justifies the assumption that the buildings in antiquity, which were built according to the Golden Proportion, were technical facilities for scalar waves. Maybe the builders had specifications that had physical reasons and could mathematically be proven.
At this place there result completely new aspects for judging and interpreting buildings especially from antiquity through the derivation of the Golden Proportion from the fundamental field equation. If we have understood their way of functioning, then we will be able to learn much from that for our own future and for the future construction of scalar wave devices.

As a further prerequisite for the ancient broadcasting technology enough field energy should be at disposal. We proceed from the assumption that

1. the earth magnetism and the cosmic neutrino radiation are tightly hanging together by the processes in earth's core,
2. the earth magnetism in antiquity verifiably was approx. thousandfold stronger than today (proven by gauging of pieces of broken pot),
3. as a consequence the neutrino radiation in antiquity as well must have been thousandfold stronger and
4. the cosmic neutrino radiation has served the transmitting plants of antiquity as an energy carrier,

any thought is absurd to reject the technical function of a temple only because it today can't be reproduced anymore. The artistic and aesthetical viewpoints, which are put into the foreground by art historians because of ignorance about the true function, rather are secondary.

The terms used to describe the broadcasting technology in antiquity in the last 2000 years have experienced a shift of meaning, so that a translation in our linguistic usage of today is necessary. The adjacent dictionary should help in that case.

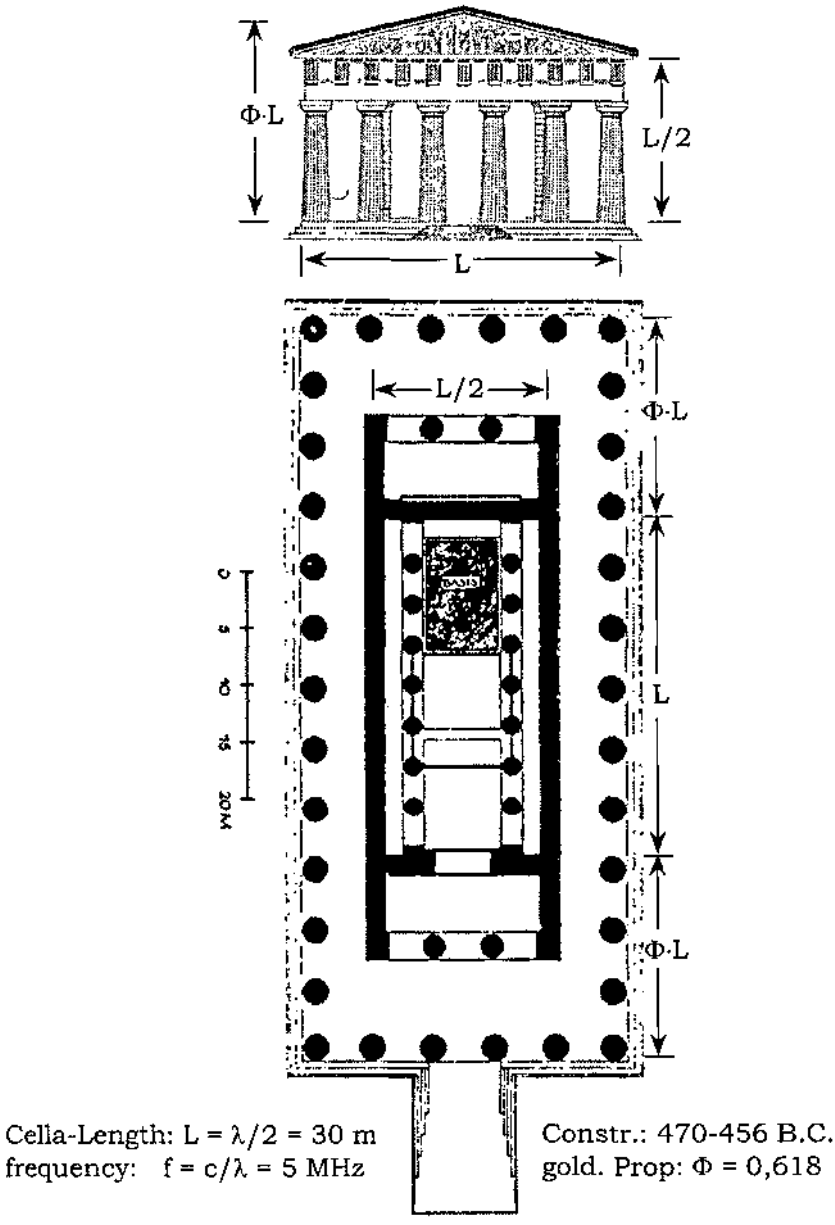


Fig. 30.3: The Golden Proportion of Zeus-temple in Olympia.<i>

<i>: K. Schefold: Die Griechen und ihre Nachbarn, Propylaen Kunstgeschichte Berlin Bd. 1, Abbildungen von Seite 249

30.3 Approach

Let's to some extent proceed from the knowledge of textbook physics currently present in high frequency engineering and give a well trained engineer the following task, which he should solve systematically and like an engineer: He should build a transmitter with maximum range at minimum transmitting power, thus a classic task of optimization. Doing so, the material expenditure doesn't play a role!

After mature deliberation the engineer will hit upon it that only one solution exists: He decides on a telegraphy transmitter at the long wave end of the short wave band, at f = 3 MHz, which corresponds to a wavelength of λ = 100 m. There less than 1 Watt transmitting power is enough for a radio communication once around the earth. That also has something to do with the conditions of reflection of the radio waves at the ionosphere. Our engineer learned:

the index of refraction $n = \sqrt{1 - K \cdot N / f^2}$ (30.1)

with:
$K = 80.5 * 10^{-6}$ [cm^3/sec^2] (= constant)
N = electron concentration [electrons/cm^3]
f = frequency of the transmitter [MHz]

Put into words: the refraction of a radio wave in the range of the short waves is the larger, the smaller the frequency is. The end of the short wave range is reached at 3 MHz. That thus explains the choice of frequency.

And he optimises further. Next the engineer remembers that at high frequencies, e.g. for microwave radiators, not cables but waveguides are used, since these make possible a considerable better degree of effectiveness. In the case of the waveguide the stray fields are reduced by an alignment and concentration of the fields in the inside of the conductor. In the case of antennas however the fields scatter to the outside and cause considerable stray losses. He draws the conclusion that his transmitter should be built as a tuned cavity and not as an antenna!

As a result the engineer puts a building without windows in the countryside with the enormous dimensions of 50 m length (=λ/2) and 25 m (=λ/4) resp. 12.5 m (=λ/8) width. The height he calculates according to the Golden Proportion to increase the scalar wave part. Those approximately are the dimensions of the Cella without window of Greek temples.
For the operation of such a transmitter in antiquity apparently the noise power of the cosmic radiation was sufficient, which arrived at the earth starting from the sun and the planets. By increasing the floor space also the collected field energy and the transmitting power could be increased, so that also from the perspective of the power supply the temple with the largest possible wavelength at the same time promised the largest transmitting power, so at least in antiquity.

Our engineer further determines, that he will switch the carrier frequency on and off at a predetermined clock pulse. Thus he decides for radiotelegraphy. The advantage of this technique is a maximum increase of the reception range. For that the signals at the transmitter have to be coded and at the receiver again deciphered. By means of the encryption of the contents these are accessible only to the „insiders", who know the code; prerequisite for the emerging of hermetism and eventually a question of power!

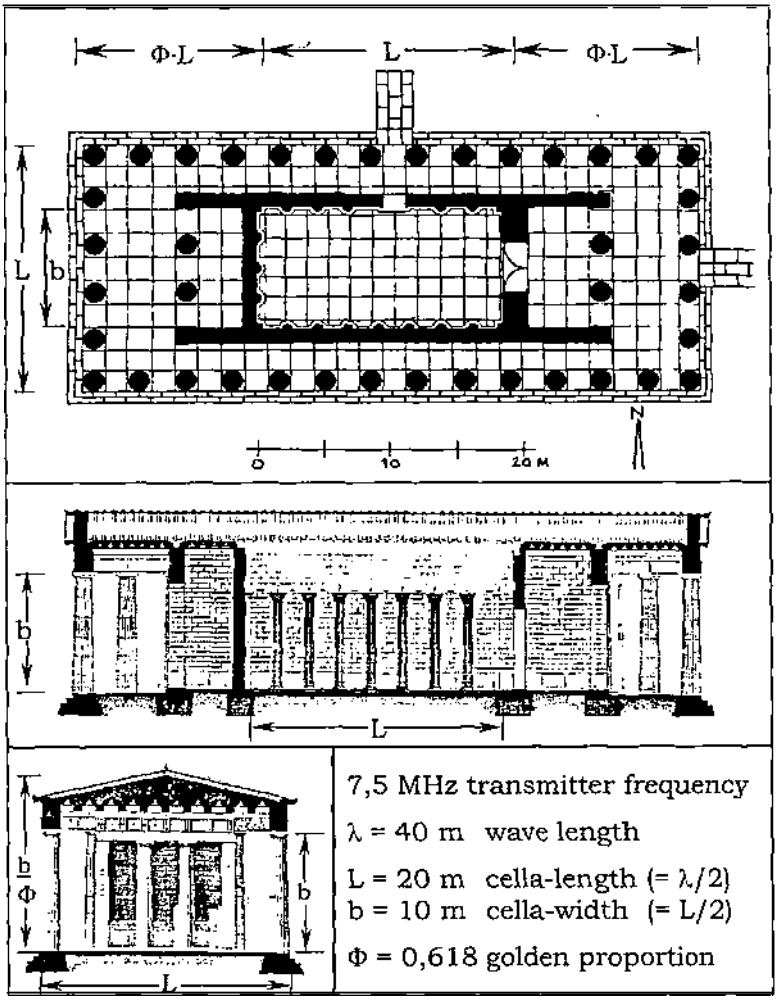


Fig. 30.4: Example Tegea, temple of Athena Alea.[<i>]
Built 350/340 B.C.

<i>: G. Gruben: Die Tempel der Griechen, Wissenschaftliche Buchgesellschaft Darmstadt 1986, 4. Aufl. Seite 130

<ii>: E. Horst: Konstantin der Grosse, Eine Biographie, Classen Verlag 1985 Dusseldorf, 2.Aufl., S. 89.

<iii>: E. Horst: Konstantin der Grosse, Eine Biographie, Classen Verlag 1985 Dusseldorf, 2,Aufl., S. 33.

30.4 Circumstantial evidence

Not everyone, somehow participating in send receive engineering, at the same time also was inaugurated in the entire secret knowledge. Most priests only knew as much as they necessarily needed to know to fulfill their tasks. Thus a temple priest, who was presented an enciphered text and who should bring this on the air, not necessarily at the same time needed to know the content of the text or the code. The same of course also was valid for the sacrificing priest acting in the receiving station. The Vestal virgins for instance had to present the received text to the Augures, by whom they were supervised and controlled.

But who wanted to introduce a new god in the gods heaven and perhaps even himself be worshipped as a god, should have complete command of both the broadcasting technique and the reception technique. In ancient Egypt the Pharao at least once a year had to prove, that he still was in command of the technique. Otherwise he was replaced. For a person with security clearance that at the same time was a death sentence.

In the historical facts numerous pieces of circumstantial evidence can be found, which can be considered to be evidence for the thesis of the operation of send receive engineering in antiquity. One now perhaps understands, why the rulers were put an antenna netting over their head, a so-called crown, or why the Augures could survey the land with a flat Tesla coil in their hands (fig. 16.10).

Direct evidence is present as well. It can be found in ancient texts. But it is questionable if historical texts concerning ancient radio engineering have been translated correctly. The talk is about oracles, mystery cult and earth prophesy if the receiver is meant. The predominantly technically uneducated historians attest the Romans a defective sense of time, because their couriers surely could not cover the long ways across the Roman empire so fast at all, if they read in the Latin texts: "They sent by courier to the emperor in Rome and got for answer...". The answer of the emperor namely already arrived at the squad at the latest in the following night. The correct translation should read: "they cabled" or "they broadcasted to the emperor in Rome and got for answer..."[ii].

Such a big empire as the Roman Empire actually only could be reined by means of an efficient communication. Cicero coined the word: "We have conquered the peoples of the earth owing to our broadcasting technology..."[iii]! The term broadcasting technology from ignorance is translated with piety. If engineers however rework the incorrect translations, then one will discover that numerous texts tell of the broadcasting technology, that thus correspondingly much direct evidence exists concerning the practical use of this technology.

For the Roman military transmitters, which formed the backbone of the administration of the empire, the reading off of the information from observations of nature like the bird flight or from felt signals of a geomanter was too unreliable. They read off the information from the rhythm of the convulsions of the intestines of freshly slaughtered animals. In the case of the dead animals on the altar every extrinsic influence was excluded. But the enormous need of slaughter cattle was a disadvantage. Who wanted to have information, first of all had to bring along an animal, which then was „sacrificed" the god, or better say, which was abused as a receiver for a particular transmitter. Thereby the innards served as a biosensor and as a receiver for the news.

Cellular phone.	
• *Network:*	All „telephone cabins" are transmitter and receiver at the same time.
• *Advantage:*	Anyone can communicate with every network participant.
• *Characteristic:*	The stations are strikingly similar in form and size of building.
• *Power structure:*	All stations as a rule have equal rights among each other.
• *Disadvantage:*	Innovations hardly are possible. The system is inflexible.
• *Examples:*	Temple towers (Iraq); cellular phone network.

Broadcasting.	
• *Network:*	Many receivers listen to the news of one powerful transmitter.
• *Advantage:*	The system is very flexible and permanently experiences improvements.
• *Characteristic:*	Monotheism. Big diversity among the receiver constructions.
• *Power structure:*	Central power concentrated in the hands of the chief intendant.
• *Disadvantage:*	Feedback from receiver to transmitter is not desired.
• *Examples:*	God Ammun Re (Egypt); ABC daily news.

Dispatch service.	
• *Network:*	Network of broadcast stations supplies an agency (receiver) with information.
• *Advantage:*	Optimal financing, since information is given away only for broadcasting fees in cash.
• *Characteristic:*	Treasury stores have to be built because of the immense riches.
• *Power structure:*	The power is concentrated in the hands of the receiver-agency.
• *Disadvantage:*	In the case of overcharge or overload a system crash is impending.
• *Examples:*	Pythia (Delphi); German Press Agency (dpa).

Fig. 30.5: Three radio technical network structures, with an example from antiquity and from present time.

30.5 Radio technical concepts

In planning and constructing radio technical networks only a few possible concepts exist. It is interesting that at least one historical example can be specified for every concept. That shows that all possibilities were tried at least once. The three most important concepts are presented here:

A. Cellular phone.
Every bigger city between Euphrates and Tigris, which thought the world of itself, had at its disposal already in antiquity a temple tower. Such a temple tower was a „telephone cabin" in the form of a pyramid as a transmitter and a receiver temple at the top, to where the receptionist adjourned to the so-called temple sleep. Discipline was required, since all the time only one priest was allowed to broadcast. All others could listen to him doing so. If he was ready, he closed his contribution with a fixed symbol or term („over") and the next one could continue. This is a classic link-up, where anyone communicates with every network participant.
The stations all were strikingly similar in form and size of building, like one phone box resembles another. In that way a further development of the cellular phone system hardly was possible and that has a technical reason, as the building of a tower in Babylon has shown us. This tower namely had gotten the ambitious builders too big, so that the frequency of the Mesopotamian radio network had been left and instead a foreign network could be received, the code of which no-one could understand. The result was a confusion of language and the order to stop the building.

B. Broadcasting.
Millions of TV spectators every evening look in the ABC news or another daily journal of a TV Channel. In the case of broadcasting thus many receivers listen to the news of a powerful transmitter. With that the whole plenitude of power is concentrated in the hands of the chief intendant. In antiquity he called himself high priest. If he went on the air, he used the logo of the god that he had to represent. Today the logo of the broadcasting company is shown in a corner of the TV screen. Even this very day feedback from the receiver to the transmitter hardly is possible contingent on principle. The problems with nationally controlled broadcasting, with politics controlled by the media all are not new. The monotheism in ancient Egypt with the claim of lordship of the main god Ammun Re is an example from antiquity.

C. Dispatch service.
In ancient Greece the technical structures and with that also the power structures had been turned around. At that time a big network of broadcast stations, which continually was extended by a policy of settlement ordered by the gods, supplied a central and correspondingly powerful agency with information per radio.
Who wanted up to date news, could call for these in the agency with seat in Delphi, but he had to pay for it. To accommodate the broadcasting fees in form of gold and gifts whole treasury stores had to be built. Measured by the commercial success the ancient news network has remained unmatched, and can't be compared with pay-TV or todays dispatch services, like dpa. If the network however becomes too big, uncontrollable and it lacks discipline, then it sometime will crack and the system crashes.

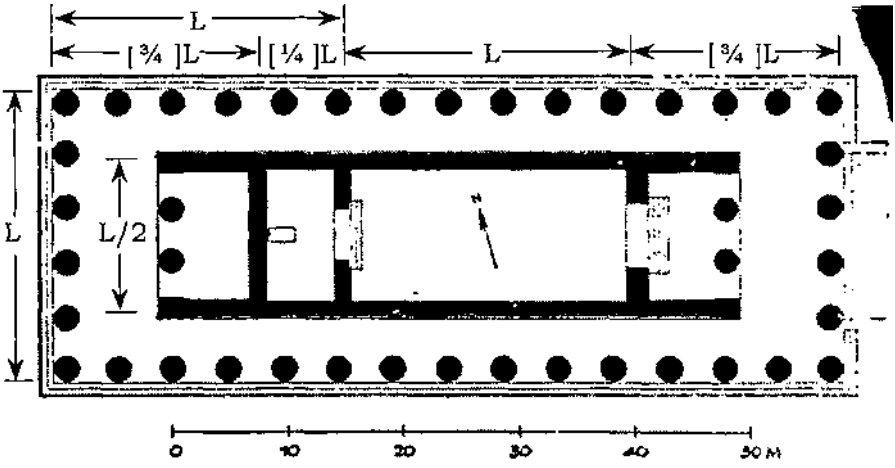


Fig. 30.6 A: Hera-temple of Selinunt 460-450 B.C.<i>
(Corresp. to the plans of the Roman architect Vitruvius)

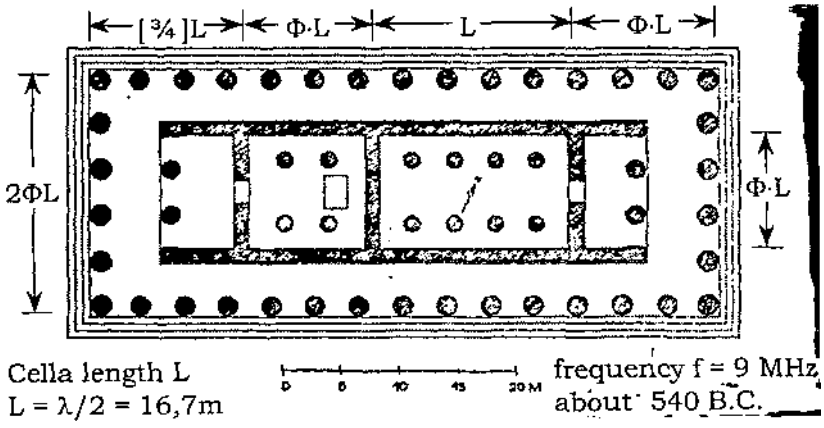


Fig. 30.6 B: Apollo-temple of Korinth<i>
(Alternative interpretation, use of the Golden Proportion Φ).

<i>: K.Schefold: Die Griechen und ihre Nachbarn, Propylaen Kunstgeschichte Berlin Bd. 1, Abbildungen von Seite 241, 250

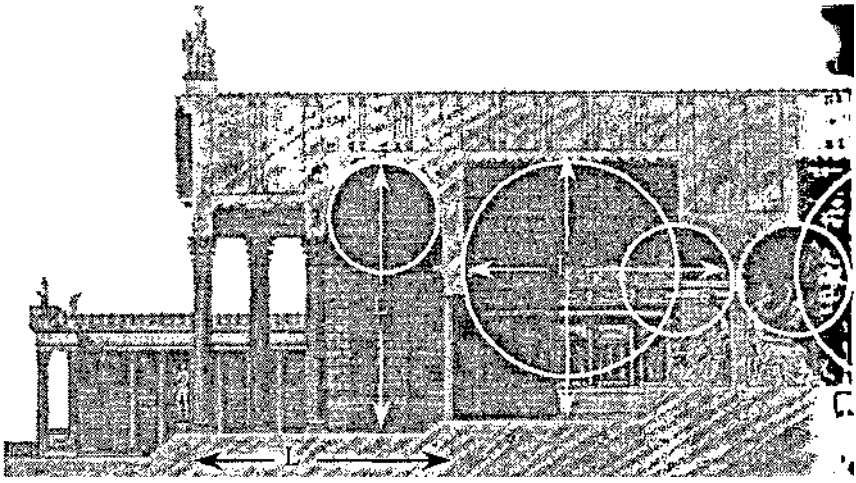
<ii>: Vitruvius (Marcus Vitruvius Pollio): Zehn Bucher uber Architektur, Ubers. von Dr. K. Fensterbusch, Wissenschaftl. Buchges. Darmstadt 1987, 4. Aufl., 3. Buch, 1. Kap.: Von den Symmetrien der Tempel, Seite 137

<iii>: Vitruvius (dito), 4.book, 4.Chap.: Vom Tempelinnern und dem Pronaon, p. 187

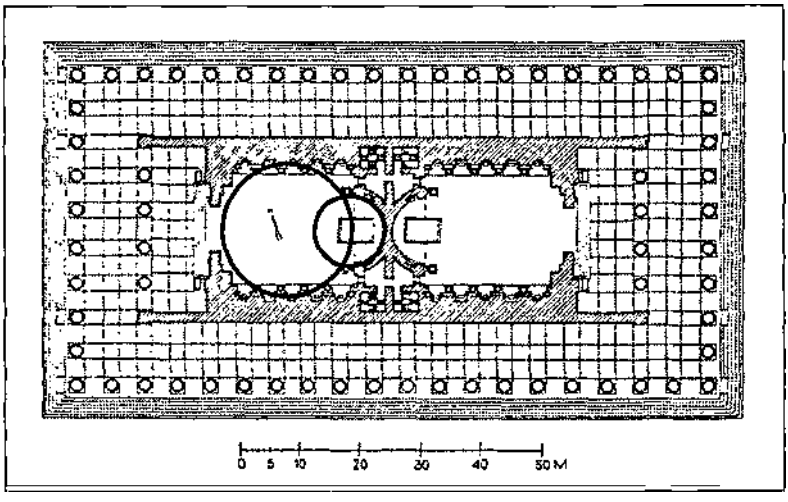
30.6 Wireless telegraphy

Radio engineering 100 years ago also started with telegraphy. Thereby the high frequency carrier is switched on and off. With this technique Marconi succeeded in a radio transmission over the English Channel (1899) and over the Atlantic Ocean (1901).
As next step the amplitude modulation (AM) followed. Thereby the HF-carrier is overlapped with the low-frequency signal of a sound carrier in such a way, that the amplitude fluctuates on the beat of the LF-signal. As a disadvantageous effect, also noise signals will overlap, from which the quality of reception will suffer.
Only the frequency modulation (FM), where the LF-signal is transmitted as temporal fluctuation of the frequency, brings an improvement. The annoying amplitude noise hence has no effect in the case of FM.
It easily can be recognized, how the development of the modulation techniques follows the urge for technical improvement and optimization. That in antiquity hasn't been different, for which reason the progress of development took place in the same order.

The broadcasting technology of the ancient gods started with the wireless telegraphy. This is expressed in the architecture. Since electric resonant circuits or other frequency determining equipment weren't at the disposal of the engineers in antiquity, the determination and allocation of the broadcasting channels had to take place by means of the wavelength. The formation of a standing wave in the Cella, the innermost sanctuary of a temple, occurs if its length corresponds to half the wavelength of the HF-carrier. The Roman architect Vitruvius calls the wavelength the ,,basic measure", from which results "the system of the symmetries". He writes: ,,The design of the temples bases on symmetry, to which laws the architects should adhere meticulously. "[ii]. ,,The length of the temple is partitioned in such a way that the width is equal to half the length, the Cella itself including the wall, which contains the door, is one fourth longer than wide. The remaining three fourths, which form the Pronaon, should protrude until the antae of the wall and the antae should have the thickness of the pillars"[iii].
If we recalculate ourselves, then the partitioning in 3/4 to 5/4 produces a proportion, which conies quite close to the Golden Proportion. In building a temple nothing is left to chance, after all it concerns the construction of a tuned cavity, capable of self-resonant oscillations with favourable emission behaviour.
From the outside one can't see if a telegraphy transmitter has been changed over to speech transmission with AM. The HF-carrier merely isn't switched off anymore, i.e. the priests let the temple oscillate without interruption. Newly added for AM is an electroacoustic coupling. For that many temples were retrofitted with a mouthpiece. Newly built AM transmitter temples conclude the Cella with a round apse. Because of this acoustically conditioned construction the Cella length didn't have a fixed value anymore and the transmission frequency had become variable. Measured in the middle of the apse the wavelength was larger than at the sides, so that on the beat of the spoken word not only the amplitude of the field distribution in the interior of the temple, but in addition also the frequency of the selfresonant oscillation was changed.
A typical example of such an architectonic hybrid form of AM and FM is situated in Rome. Because due to the frequency variation more than only one wave band was occupied and the temple consistently carries the names of two deities. It is the temple of Venus and Roma.



Diameter bigger circle D_1= 22 m (6,8 MHz),
small circle D_2 = 11 m; und L = D_1 + 1/2 D_2 = 27,5 m (5,5 MHz)



Fig, 30.7: Temple of Venus and Roma; Rome 136/37 A.D.[<i,ii>]

<i>: A. Springer: Das Altertum, A. Kroner Verl. Leipzig 1915, 10. Aufl., S. 518
<ii>: T. Kraus: Das romische Weltreich, Propylaen Kunstgesch. Berlin Bd. 2, S. 161
<iii>: Lamer: Worterbuch der Antike, Kroner Verl. Bd.96 unter "Tempel", Haufigkeit

30.7 AM temple technology

The low-frequency signal (LF), which should be transmitted by a transmitter with amplitude modulation, lies in the range between 16 Hz and 16 kHz. If it only concerns the transmission of speech information, then the bandwidth can be reduced to 300 to 3000 Hz. In the case of mixing the low-frequency useful signal with the HF-carrier, thus in the case of the modulation of the carrier in the rhythm of the LF, two side bands arise. These lie close to the carrier frequency and are formed from this once by the addition and once by the subtraction with the frequency of the LF-signal. Let's take the temple of Venus and Roma with a transmission frequency of 6.8 MHz. If sound of 3 kHz should be transmitted clearly understandable, then the dimensions of the Cella had to be varied for just 8 mm for a corresponding Cella length of $\lambda/2$ = 22 m. As a curiosity the niches in the side walls in the case of this temple however allow a considerably larger bandwidth of more than 10% instead of the necessary 0.04% in the case of AM.

In the case of the Greek originals, the Cella however has smooth walls, from which follows that the temples were designed ideally narrow band. The Greeks apparently operated predominantly telegraphy transmitters, for which the side bands coincide with the carrier.

The argumentation indeed has remained unchanged: The modulator being narrow band and simple to realize speak in favour of the telegraphy being the "original form" of all modulation techniques. Also the rediscovery of the broadcasting technology by Heinrich Hertz succeeded as telegraphy signal. In addition the range is bigger than for any signal modulated with sound frequency.

As the calculation example has shown, also pure AM transmitters work very narrow band, and this is particularly important for low transmission frequencies, if many transmitters want to use the favoured SW band between 3 and 10 MHz at the same time. With AM one thus accommodates the maximum number of broadcasting channels in a particular frequency range, for instance the 80-meter band, without these interfering with each other too much. But that also was badly needed. Conclusions about the everyday life of broadcasting in antiquity by all means are possible because of the enormous number of temple installations, which logically were permanently used. Only in Rome there existed up to 200 temples[iii]!

Who goes in search of broadcasting stations with a modern short wave receiver, for instance in the 80 m band between the countless telegraphy transmitters, fast gets an idea of what had been up in the air already 2000 years ago. No ancient city would build several temples on a single Acropolis, if only one single one could have been used. All temples broadcasted with each time another carrier frequency because of different dimensions. For this reason the temples, which stood side by side, as a rule were dedicated different gods. An acknowledgement, "the air just being free", in addition hardly was possible, because of the often-found spatial distance between the temple installations and the respective oracle. Between the transmitter of the god Apollo in Didyma and the receiver, the oracle of Milet, for example lie approx. 20 kilometres. The only possible conclusion is that in antiquity there was broadcasted on all channels simultaneously regardless of other gods and their transmission frequencies. As is well-known there rather prevailed a situation of competition between the gods, since like today a large number of listeners meant great importance, influence and power and eventually also worship, more gifts and more receipts from broadcasting fees.

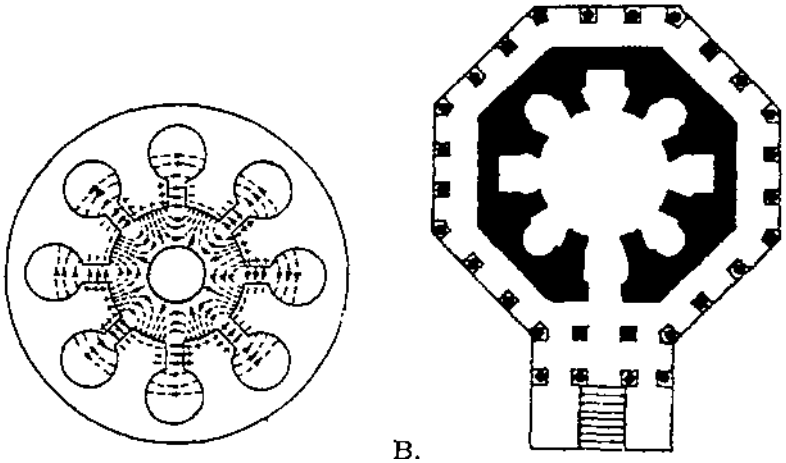


Fig. 30.8: ____ Comparison of a magnetron (A), a microwave radio tube<i> and the temple (B) in the palace of the emperor Diokletian, Split.<ii>

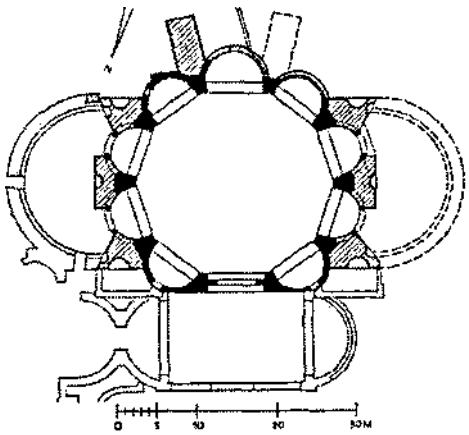


Fig. 30.8.C: Temple of Minerva Medica, Rome, 320 A.D.<ii>

<i>: K. Simonyi: Physikalische Elektronik, 8.4 Das Magnetron, S. 665

<ii>: T. Kraus: Das rom. Weltreich, Propylaen Kunstgesch. Bd. 2, S. 194, 196

<iii>: If one however wants to verify this, in antiquity already common manner of PM broadcasting technology, then we need a broadband short wave receiver with phase-demodulator. With such a receiver even today any time a conclusive argumentation should be possible that this sort of SW-PM technology actually works.

30.8 Modulation of acoustic signals

In the case of sound it in essence concerns longitudinal waves, which propagate in all directions in space with the velocity of sound. But this merely is an average velocity, since the air molecules strictly speaking oscillate with the sound frequency in the direction of propagation. In this way the velocity of sound one time is increased and the next moment to the corresponding extent reduced. If the molecules already carry out oscillations of themselves, e.g. thermal motion, then both oscillations overlap; i.e. the motion of itself is modulated with the sound frequency.
Following the here presented derivation potential vortices are formed in every dielectric, thus also in air, and these are modulated if overlapped with sound waves. Vortices however do not form a distinct frequency, but entirely on the contrary a uniform frequency mixture in the form of white noise.
The overlap thus also is noise unless certain noise frequencies are favoured. This can be effected by means of a spatial body tuned to a certain wavelength. To be considered are cuboid cavities, as in the case of Greek temples or waveguides and cylindrical objects as in the case of round temples or magnetrons. The building form causes the favouring of a certain frequency and the integer harmonic frequencies belonging to it.
If this frequency now lies in the high frequency range, then it is emitted by the spatial body as an electromagnetic wave, in the case of waveguides and resonant circuits for reason of the small dimensions as microwave radiation and in the case of the Greek temples as short wave radiation. If one in addition produces an acoustic signal in the frequency determining spatial body, then this signal automatically will modulate the high-frequency signal.
The result of the modulation is the overlapping of the sound wave with the high-frequency carrier wave. The change of the active length, thus the wavelength of the HF-carrier causes a change of frequency. Such a change on the beat of the sound frequency is called FM (frequency modulation). For that we imagine a spatial body being excited because of its length by potential vortices to a high-frequency oscillation at the self-resonant frequency.
From flow dynamics is known, how easy the distribution of vortices in space can be disturbed. Already words spoken in space are able to influence the potential vortices, which in the case of the temples were used as energy carrier. The longitudinal sound waves reflected at and thus returning from the Cella wall rigid for sound of a Greek temple will push these potential vortices back on the beat of the sound and with that shorten the active length. This means, that the carrier frequency is modulated with the sound frequency. The carrier oscillation thus permanently changes its phase on the beat of the sound signal, for which reason this particular kind of modulation is described as PM, as phase modulation.

Nowadays PM is used only seldom and in the SW-range not at all because of the big need of wave bandwidth. Merely at higher frequencies PM occasionally is used in radiotelephony. In the case of the frequency modulation usual in broadcasting (e.g. UHF), the change of frequency takes place on the beat of the sound amplitude and not of the sound frequency as with PM. Therefore it is not possible to receive phase modulated signals, which are produced by means of the acoustic coupling of appropriately formed spatial bodies[iii] with commercial FM receivers.

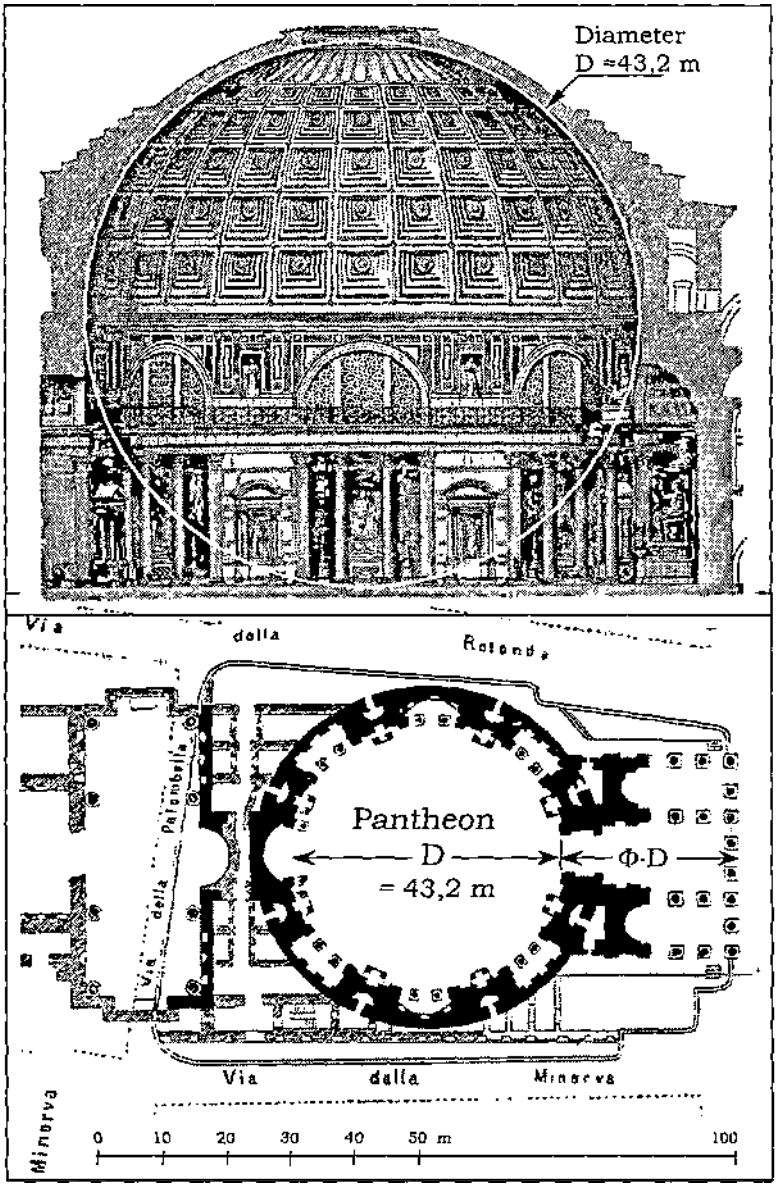


Fig. 30.9: The Pantheon in Rome, the „temple of all gods".[<1>]
Diameter D = 43,2 m, Golden Proportion: Φ = 0.618
Pronaon-(atrium-)length: $\Phi \cdot D$ = 0.618 • 43.2 = 26.7 m
Built under emperor Hadrian 118/ 119-125/128 A.D.

30.9 Broadband FM broadcasting technology

If I speak against a flat wall, then every point on the wall has another distance to my mouth. The sound waves thus aren't reflected simultaneously, what leads to big modulation distortions. Therefore the sound wall should be curved in such a way, that all signal paths are the same length (barrel vault, apse, etc.). In the case of point sound sources there results as an optimum a hemisphere, for instance a dome. The building hence even today tells us, which frequency and which modulation method had been put to use. The architecture of sacral buildings, e.g. pointed arch or round arch, thus hardly has been a question of aesthetics.

For his temple of Venus and Roma designed by himself emperor Hadrian had to listen to severe criticism among others of Apollodor of Damascus. The temple was too broadband for an AM transmitter, however with a modulation depth of just 11 percent not broadband enough for a phase modulated FM transmitter.
Emperor Hadrian however also had the courage to build midst in Rome a temple calculated completely new and designed as a pure FM transmitter, the Pantheon, which means temple of all gods. In the language of the technician it is a transmitter for all frequencies.
This domed structure indeed doesn't leave out one single frequency. With a modulation depth of almost 100 percent it is designed for maximum loudness. With that the Pantheon uses all available frequencies, for which reason the name temple of all gods really is no exaggeration. Into the Pantheon exactly fits a sphere with a diameter of 43.2 meter. That corresponds to a minimum frequency of 3.47 MHz, situated in the range of the short waves. The floor however is not domed, but horizontal. That, up to the basis of the dome, results in exactly half the height and a maximum frequency of 6.94 MHz.
The construction ensures that between the simple and the double diameter any desired wavelength can be produced. Above the given maximum frequency of the basic oscillation the harmonic waves, which are produced as well and can't be avoided at all, are attached without a break. These occupy the wave bands up to the double, triple, quadruple frequency and so forth.
For this and only for this reason a maximum frequency was chosen, which corresponds to exactly the double value of the minimum frequency. The operation takes place to the limit, where the transmitter would interfere with itself, in the way that the used basic oscillation would overlap its own harmonic waves. That then sounds like two people talking at the same time. The voices would be distorted out of recognition, as can't be expected else in the range of the harmonic waves.
The Pantheon has been planned and built as a phase modulated basic wave transmitter according to purely academic rules of Hadrian. The temple impressively demonstrates the precise engineering detailed knowledge of the Pontifex Maximus and his broadcasting priests in ancient Rome<ii>.

<i>: A. Springer: Die Kunst des Altertums, A. Kroner Verl. Leipzig 1915, 10. Aufl., S. 517/518, daraus: die Zeichnungen ram Pantheon in Rom, 115-125 n.Chr.

<ii>: The collection of material concerning scalar wave technology here is aborted and continued in an own book in narrative and with that easier to read writing style. The title is: "Broadcasting Gods".

approach	**derivation**	**result**
b:= postulate [potential vortices Vol.1]	what if **b** ≠ 0 ?	**derivation** of the **Schrödinger eq.**
duality vortices replace quanta [potential vortices Vol.2]	from **H** ⇔ **E** from **j** ⇔ **b** [and chapter 3.3]	**calculation** of the **quantum properties** [potential vortices V.2]
causality [see chap. 3]	*gen.* ⇔ *special case* **field** ⇔ quanta cause ⇔ consequence (instead of: quanta ⇔ field)	*vortex field* free of quanta (instead of: irrotational field of quanta)
vortex physics analogous to flow dynamics [chap. 3.4 - 3.5]	**vortex + anti-vortex** (Demokrit/cosmology) [chap. 3.6 + 27.2]	coming off of vortices if $\tau_1 = \tau_2$ **model of atom** [chap. 5.5 + 5.8]
equations of transformation: **E** = **v** x **B** **H** = - **v** x **D** [chap.6.5 + 27.8]	for **E**(**r**(t)) and for **H**(**r**(t)): rot **E** = rot (**v** x **B**) rot **H** = rot (**D** x **v**) [chap. 27.9]	extended **field equations:** rot **E** = -**b** -∂**B**/∂t rot **H** = **j** + ∂**D**/∂t [chap. 27.10]
equations of transformation: **E** = **v** x **B** **H** = - **v** x **D** [s.a. chap. 16.1]	**wave equation** inhom. Laplace eq. Δ**E** = grad div **E** - rot rot **E** Δ**E** = $(1/c^2)\cdot\partial^2$**E**/∂t^2 [chap. 27.13] [chap.22.4]	transverse + longitudinal wave parts: **scalar waves,** noise, etc.
equations of transformation: [chap. 28]	vortex overlap **length measures depending on field**	**gravitation, temperature,** theory of objectivity

Fig. 30.10: (All) Many roads lead to Rome.

30.10 Epilogue

The preparation for a seminar or a lecture always starts with a collection of material. This should be considerably more detailed than the material to be communicated, since it doesn't get well at the students and also other participants, if the state of knowledge of the lecturer already is exhausted with the scope of his lecture. For this reason the collection of material must also include alternative derivations and areas of knowledge, which thematically rather are marginal, about which mustn't be reported, which possibly not even can bear criticism but still are in the public discussion. For a collection of material, which wants to be considered to be comprehensive and complete, it is important that no area and no theme has been overlooked.

The here presented collection of material with its 650 pages has become correspondingly voluminous. After all the material has been collected over an 8 year period and has been strung into the book in the order of working. That of course complicates reading the book, because individual aspects are repeated several times, but often also in a different context and each time lighted from another side. If the reader somewhere has the feeling, he only has turned in a circle, then has deceived himself. He indeed moves spirally in a circle, like in real life, but he doesn't come out there, where he started. After one turn he is richer with the experience of this spiral turn. In whole science the advancement takes place as a spiral movement and one can count oneself fortunate, as long as the spiral has an ascending slope! This notion should solace the reader, who has undertaken the torture to work through the complete collection of material.

Students also have reported, they had devoured my book like a thriller and a colleague, who had acquired it at a conference in Switzerland, was digging so much in the lecture that he forgot to get off the train timely.

It is a special concern to give reasons for the necessity of an extension of available field theory. To achieve this goal several derivations (fig. 30.10) can be found in my books: from a postulate, from causality, from duality, from vortex physics, from the equations of transformation, etc. added are at least a dozen derivations of other authors from various publications, who at most are cited. With that the goal is pursued that all approaches, which are conceivable and worth discussing, can be put side by side and tested for their efficiency.

Since it isn't the task of a collection of material to answer this question, this must be done by the hearer resp. the reader of the books. He is prompted to find the answer himself! That leads to an intense contention with the theme and that exactly is the reason for the otherwise rather unusual step to make a collection of material open to the public. Objections and criticism of the content of a relation of matters or also only of the representation of the context is wished explicitly. This also isn't valued as criticism of the author or of the superordinated set of difficulties, which in principle isn't possible at all for a collection of material.

Honorary functions of

Prof. Dr.-Ing. Konstantin Meyl

Fig. 30.11: Honorary functions of the author (December 2003, selection).

There in principle is no necessity at all to discuss with everybody a collection of material, which I have compiled exclusively for own events. It is absolutely sufficient, if few, but then qualified experts have thoughts about the content and communicate them to me. They can feel certain that I don't hand down their judgement to other persons. For that I also have been blamed by ignorant colleagues, who in complete self-overestimation have the opinion, they should be informed about everything. Right is rather, that my private correspondence is of no concern to anybody, since I find it important that as much readers as possible express themselves frank, what only functions, if they can feel certain that they afterwards won't be involved in public mud-wrestling. Therefore I keep still as regards other persons however curious they might be.

Indeed over and over again pseudo scientists turn up, who have the erroneous opinion that scientific arguments would take place on some internet-forums, where one can descant at will and anonymous, hidden behind an alias, where the intellectual firebug can feel safe, not afterwards being blamed for his crimes.

No, science takes place entirely different. A new theory will be able to establish, if it is right and important and if it is used for practical uses. Losers are those authors of a theory, for the elaboratation of which nobody is interested. What does a publication in a journal, however renowned, mean, if nobody reads it and nobody needs it? Most new ideas and approaches go under without notice in today's flood of publications, for who has got the time to read all essays in full?

Desperate they turn to me hoping, at least I could understand their concern. I then invite these scientists to a congress of the „Society for the Advantage of Physics", of which I am the president and offer them a forum, where they are able to present their ideas to an expert public. Not all lectured ideas prove to be sound, but not seldom a physical concern, which should be taken very serious, is behind it.

For a long time the real scientific controversy doesn't take place anymore at the universities and their congresses, where hardly someone dares to lecture arguments against the convention. Too fast he would be expelled as outlaw from the honourable society. From time to time however also from these circles colleagues dare anonymously or privately, as they emphasize, into the alternative events of lobbies or clubs, to astonished find out that real science there still is practised and that there is discussed about ideas, which they have given up thinking or have forbidden themselves to think about. The employment activity, so they excuse their thinking prohibition, allegedly doesn't allow it.

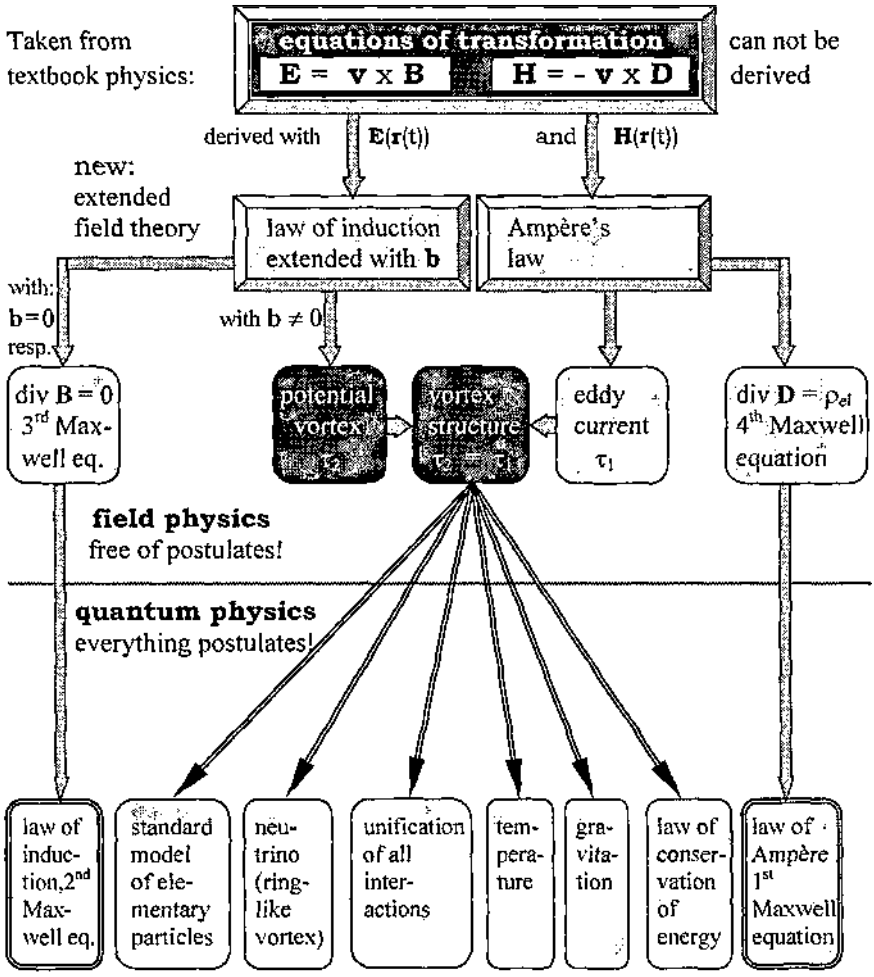


Fig. 30.12: Derivations of postulates and axioms (part 1).

Be that as it may, the approaches and derivations contained in my collection of material are considered to be controversial, and that is good that way! The public takes notice and professional circles are occupied with the ideas. With that half the way to success already is brought off! It now concerns to knock off all points for their soundness individually, because the next step will be to search a way to the goal as unassailable as possible, which is able to convince also the biggest sceptic. The final version, which then should appear in accredited peer-reviewed journals and in a scientific book concerning the theory of objectivity, goes in this direction. From the numerous approaches in the end only one will be used, and from the countless, in the collection of material listed aspects only the noncontentious ones will remain.
The dispute, which in the current stage can't be avoided, yes even is desired, however shouldn't deceive about the fact that it here doesn't concern persons, improper vanity or some image cultivation, but simply and solely concerns the matter!

In fig. 30.12 and 30.13 is represented, what it concerns. Field physics and quantum physics don't form, as in common practise, an insurmountable opposite, but even complement each other! Below the stripline a little selection of the today in current use quantum physical postulates can be found. The number of newly introduced „constants of nature" and postulates permanently is increasing, a circumstance, which hardly can be mediated to the common sense. The bracket is missing, which interlinks all postulates, or the common source from which they can be derived causally.
In the progress of the three-part edition in this question, essential for physics, already a satisfying and in addition real efficient answer has been found in the domain of field physics. The coupling marked by individual derivations can be found above the stripline and it is entirely new, apart from the dashed indicated derivation (fig. 30.13), as given by Prof. Bosse (TU Darmstadt) in his textbook.
An approach in principle can be chosen freely. In the case of the superordinated field theory two equations of transformation form the approach, which already is laid down in textbooks and secured experimentally. That's why the whole field theoretical derivation manages without one postulate! It is pointed to the fact that these equations on their part can't be derived and should be interpreted rather philosophically than physically. From this approach the extended field theory is derived directly, without a need to add or discard a term. The extended field theory consists of the well-known law of Ampere extended with the dielectric displacement D by Maxwell, and of Faraday's law of induction, which experiences an extension with the vector of potential density b by means of the derivation. Doing so we assume that the field pointers of the electric and the magnetic field strength depend on the spatial coordinate r and through this indirectly also on the time t: E(r(t)), H(r(t)).

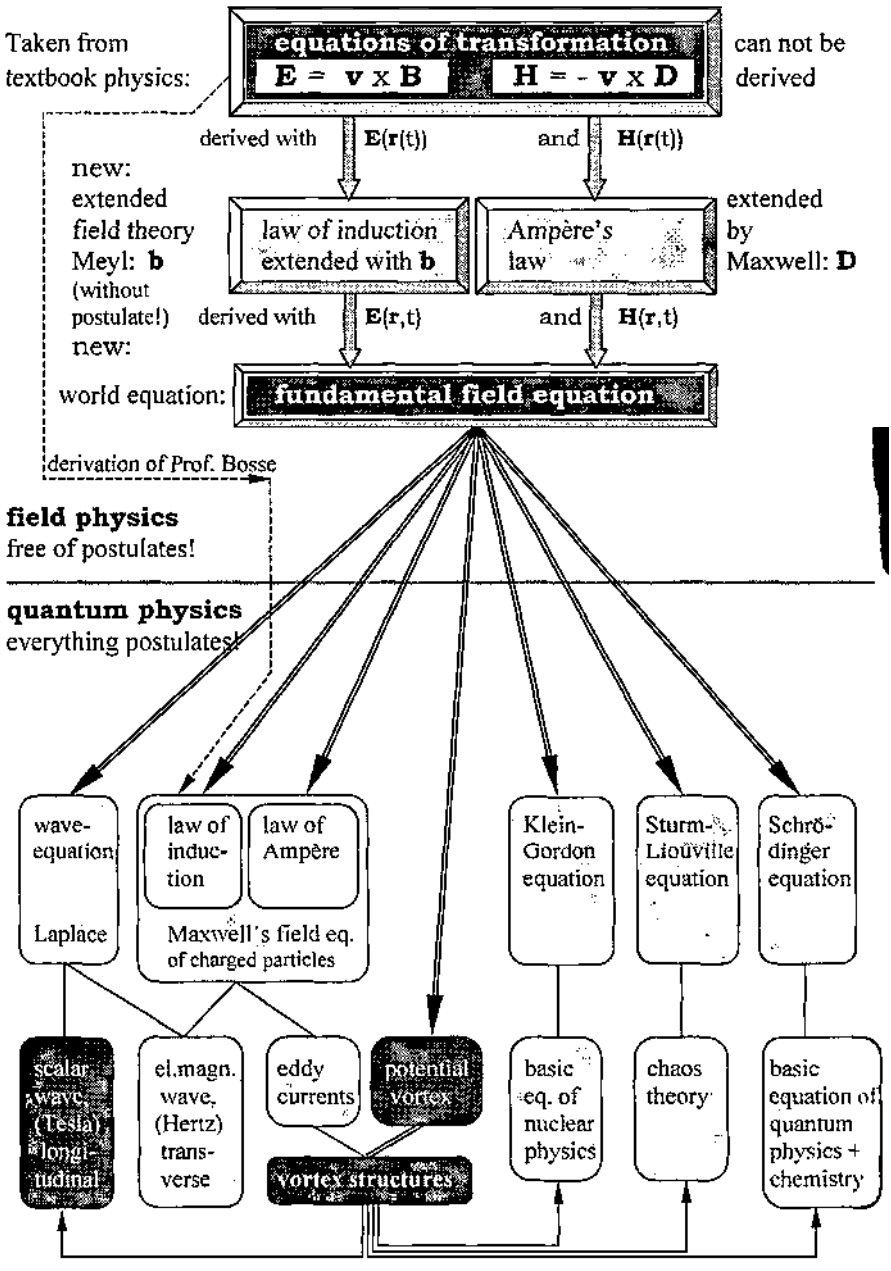


Fig. 30.13: Derivations of postulates and axioms (part 2).

If the somewhat more general case is counted up, in which case apart from the spatial a direct temporal dependency is present (E(r,t) and H(r,t)). then further additional terms appear in addition to the extended field equations, which need an explanation also for the case that they are zero. The physical interpretation would implicate a longer treatise, which however can be circumvented, as shown here, by constraining the field pointers, which absolutely is allowed according to the slogan: for the case E(r(t)) and H(r(t)) chosen from many possibilities the extended field equations come out exactly in the form, as they are required and suitable for the further calculations. Who has got to calculate other cases, can do that as he likes, but doing so he should not get lost. Maxwell's field equations are contained in the solution and with that also continue to be valid. Their disadvantage however is that without the extension b not a single quantum physical postulate can be derived. If we add this extension and insert the equations into each other without addition and without cuts also this time a central solution is the result, which is called fundamental field equation.

The derivation is known as well from the Maxwell theory, in which case it is common practise, to use the general approach (E(r,t) and H(r,t)), what we in accordance with the textbooks can do in the same manner. The extension however brings two additional and extremely significant terms. Since the fundamental field equation has eigenvalues under certain boundary conditions and describes structures, various quantum postulates come out from it, from the quantum properties of the elementary particles over the Schrodinger equation and the inhomogeneous Laplace equation up to the derivation of the Golden Proportion. That justifies the assumption that this possibly is the long sought-for world equation!

Even I, as the initiator, was totally surprised by the found derivation of the most important quantum physical postulates and axioms. One just is doing it the right way and already everything fits together! I am not aware of any theory, which would be able to achieve something roughly comparable. The since long sought-for ,,Theory of Everything", the big unification theory really falls into ones lap. The known interactions are the free and easy result of analysing the field lines of electric and magnetic field strength (fig. 30.12). Physical phenomena, which until now were considered to be incompatible, like e.g. waves, noise or the temperature with the utterly insufficient concepts of the mechanisms for the conversion of one form of energy into another, can be represented consistently with the fundamental field equation as the rolling up of a wavelike field oscillation to a vortex oscillation and as conversion of the noise vortices in the case of a vortex contraction down to atomic dimensions as thermal oscillation, which we treat as vortex losses. There exists no alternative to such unified schemes of things, as makes it possible in abundance the theory that I have founded, considering the two conditions, that on the one hand in the case of the derivation only known regularities are used, by completely doing without postulates and that on the other hand laws are applied and adhered to, also physical laws.

The new schemes of things, which sound unfamiliar, thus already were contained in the laws of physics. After this now having been realized, the tables turn. Now the explanations by postulates, as they at the moment still are being taught, should be replaced by the newly derived ones, if one doesn't want to become a breaker of the law! There doesn't lead a way past the overdue reform of physics anymore.

If you want to correspond with me or if you want to get one of my books from the bibliography, then please consult my Transfer Centre in the Technology Centre of St. Georgen (Black Forest, D).

Address: 1st Transfer Centre for Scalar wave Technology
Prof. Dr. Konstantin Meyl
Leopoldstralsse 1
D-78112 -St. Georgen /Germany
Fax.: +49-7721/51870

email: meyl@k-meyl.de or: meyl@fh-furtwangen. de

Internet: http://www.k-meyl.de or www.meyl.eu

The list of deliverable books (for ordering books over the above given address, Fax, Mail or postcard suffices):

* Wirbelstrome, Diss. University Stuttgart 1984, ISBN 3-9802 542-0-8, 14
* Potentialwirbel Band 1, 1990, ISBN 3-9802 542-1-6 (German), l4
* Potentialwirbel Band 2, 1992, ISBN 3-9802 542-2-4 (not available)
* Elektromagnetische Umweltvertraglichkeit, Teil 1, 2 and 3 (German), ISBN 3-9802 542-8-3, 3-9802 542-9-1 and 3-9802 542-7-5. Each 16
* Scalar wave technology, 2003, documentation and manual to the demonstration-kit and to the experimental-kit (translated and copied).
* Sendetechnik der Gotter, historischer Sciencefictionroman, (in German) 1 .Aufl. 2004, ISBN 3-98O2 542-5-9, l2
* Neutrinopower, Johannes von Buttlar im Gesprach mit Prof. Dr. Konstantin Meyl, (Discussion in German) Argo-Verlag 2000,

(A bill is enclosed in the delivery.)

Fig. 30.14: Contacting address and list of deliverable books

Table of formula symbols

	Electric field			Magnetic field	
E	V/m	Electric field strength	**H**	A/m	Magnetic field strength
D	As/m²	Electric displacement	**B**	Vs/m²	Magnetic induction
U	V	Tension voltage	I	A	Current
ε	As/Vm	Dielectricity: $\varepsilon = \varepsilon_r \cdot \varepsilon_o$	μ	Vs/Am	Permeability: $\mu = \mu_r \cdot \mu_o$
Q	As	Charge	ϕ	Vs	Magnetic flux
e	As	Elementary charge	m	kg	Mass
τ_2	s	Relaxation time constant of the potential vortices	τ_1	s	Relaxation time constant of the eddy currents: $\tau_1 = \varepsilon/\sigma$

other symbols:

A	m²	Area	Q	Nm = J	Heat energy
a	m	Distance	r, R	m	Radius, radius of the earth
b	m	Width			
c	m/s	Speed of light	r_e	m	Radius of the electron
c_o	m/s	Speed of light in vacuum	s	Nms	Spin
C_e	As/V	Capacity of the electron	t	s	Time, time to orbit
C_ρ	J/K	Heat capacity	T	K	Temperature
d	m	Thickness	U	Nm	Potential energy
E,W	Nm	Energy	U_e	V	Tension voltage of the electron
f	1/s	Frequency			
F	N	Force	v	m/s	Velocity
G	m³/kg·s²	Gravitational constant	V	m³	Volume
g	m/s²	Gravitational acceleration of the earth	W	Nm	Energy
			w	N/m²	Energy density
h	m	Height	W_e	Nm	Energy of the electron
h	Nms	Planck's quantum of action	z_e	-	Number of the involved elementary vortices
ħ	Nms	Quantum of angular momentum: $\hbar = h/2\pi$	λ	m	Wave length
j	A/m²	Current density	ω	s^{-1}	Angular frequency, angular velocity
J	kg·m²	Moment of inertia			
J ω²	kg·m²/s	Angular momentum	σ	Vm/A	Specific electric conductivity
k	Nm/K	Boltzmann constant			
l	m	Length	ρ	kg/m³	Density ρ = m/V
m	kg	Mass	ρ_{el}	As/m^3	Electric space charge density
M	kg	Mass of the earth			
n,ν	= 1,2,3..	Running parameters	ψ (r,t)		Complex wave function
N	-	Constant	ϕ (r)		Function of space coordinates
O	m²	Surface area			
p_m	Am²	Magnetic moment	Φ		Golden Proportion

Definitions:

Speed of light	$c = 1/\sqrt{\varepsilon \cdot \mu}$	m/s
Speed of light in a vacuum	$c_o = 1/\sqrt{\varepsilon_o \cdot \mu_o}$	m/s
Moment of inertia (orbit)	$J = m \cdot r^2$	kg·m²
Mom. of i. (homogeneous sphere)	$J = (2/5)m \cdot r^2$	kg·m²
Angular velocity	$\omega = v/r = 2 \cdot \pi/t$	1/s
Surface area of a sphere	$O = 4 \cdot \pi \cdot r^2$	m²
Volume of a sphere	$V = (4/3) \cdot \pi \cdot r^3$	m³

Concerning vector analysis:

Bold print = field pointer (vector); further information in fig. 5.0 in part 1

Prof. Dr.-Ing. Konstantin Meyl:

Scalar wave technology

for the transmission of electric scalar waves

Abstract: 1. Auflage 2000, 2. Auflage and 1st English edition 200

This book is recommended to people, who search the entry into the world of the by the author discovered potential vortices and their propagation as a scalar wave by experimental means. It starts with the instructions to six extraordinary experiments. Doing so an electric radiation is proven, which transmits energy, and that even faster than the light. Also more energy can arrive at the receiver then is put into the transmitter. Who entertains a doubt, will be able to understand the experiments with this book in his hand, to afterwards test the experiments with the gauge, which he is familiar with.

The 1st edition in English at first only includes the instructions for the experiments. In a subsequent edition it will be complemented with a collection of test protocols and progress reports. These are organized into three groups: one group is striving to explain the behaviour of the transmission line conventionally, a legitimate concern, which in a number of points also is able to convince. A second group only is interested in those phenomena of the experiment, which can't be explained conventionally and which prove the existence of scalar waves, whereas the third research group continually strives for new spectacular experiments and practical applications.

Documentation

Belonging to the experimentation and demonstration kit for the transmission of electric scalar waves

INDEL GmbH, Verlagsabteilung, Fax: +49-7721-51870
Tel.: +49-7724-1770
Postal and ordering address:
l.TZS, Prof. Dr. K. Meyl, Leopoldstr. 1, D-78112 St. Georgen/Schwarzwald
www.k-meyl.de mevl@k-meyl.de

Bibliography

A. Primary literature (Publications concerning the theory of objectivity):

[1] K. Meyl: Potentialwirbel, Band 1, INDEL Verlagsabt. Villingen 199O, ISBN 3-98O2542-1-6

[2] K. Meyl: Potentialwirbel, Band 2, INDEL Verlagsabt. Villingen 1992, ISBN 3-98O2542-2-4

[3] K. Meyl: Wirbelstrome, INDEL Verlagsabt. Villingen 1984, ISBN 3-98O2542-O-8 / Dreidimensionale nichtlineare Berechnung von Wirbelstromkupplungen, Diss. Uni. Stuttgart 1984

[4] K. Meyl: Einheitliche Theorie bei feldstarkeabhangiger Lichtgeschwindigkeit, Forschungsbericht der Fachhochschule Furtwangen 1992, l.Aufl. Seite 41-43

[5] K. Meyl: Wirbel des elektrischen Feldes, eine neue Storquelle? EMC Journal 1/95,6. J, S. 56

|6] K. Meyl: Gefahrdungspotential und Umwelrvertraglichkeit elektromagnetischer Felder am Beispiel der Funktelefone, Waerland 2/96 (1996), S. 21-23.

[7] K. Meyl: Wirbel des elektrischen Feldes, ein Beitrag zum Thema Uberlichtgeschwindigkeit; Wetter-Boden-Mensch 1/1997, ISSN 0940-5984, Seite: 79-89.

[8] K. Meyl: Physikalische Grundlagen einer Frequenztherapie, W.-B.-M. 6/1997, Seite: 8-15.

[9] K. Meyl: Die Wechselwirkung der Neutrinos, uber Massnahmen, die Halbwertszeit beim radioaktiven Zerfall herabzusetzen; intern.Tagung „Neue Energietechnologien aus USA", Zurich am 6.12.97, abgedruckt im NET-Journal (Neue Energietechniken), ISSN 1420-9292, Heft 1/2-1998, S. 14-20

[10] K. Meyl: Objektivitatstheorie, Ein Weg aus der quantenphysikalischen Sackgasse, 1. Beitrag: Der Ather und die Einsteinsche Fehlinterpretation, W.-B.-M. 3/1998, ISSN 0940-5984, Seite 39-44

[11] K. Meyl: Objektivitatstheorie, Ein Weg aus der quantenphysikalischen Sackgasse, 2. Beitrag: Die Vereinigungstheorie, Wetter-Boden-Mensch 4/1998, ISSN 0940-5984, Seite: 31-38

[12] K. Meyl: Longitudinale elektrische Wellen und Wirbel, Vortrag der „Internationalen Gesellschaft ftir interdisziplinare Wissenschaften" in Frankfurt am 21.3.1998, veroffentlicht im Vortragsband des "Bundesverbands gegen Elektrosmog e.V." ISBN 3-00-003124-3, Hohenstein, S.79-91

[13] K. Meyl: Biologische Wirksamkeit elektromagnetischer Wellen, Fluch (Elektrosmog) Oder Segen (Frequenztherapie)?, CO'MED, Fachmagazin fur Complementar-Medizin Nr. 10, Dez. 1998, S. 51-55

[14] K. Meyl: Elektrosmog, die physikalischen Grundlagen, Magazin 2000 plus Nr. 134,12/1998, S. 32-37

[15] K. Meyl: Freie Energie und die Wechselwirkung der Neutrinos, W.-B.-M. 3+4/1999, Seite: 21-29

[16] K. Meyl: Skalarwellen und ihre biologische Wirksamkeit, Vortragsband der Deutschen Gesellschaft fur Energetische und Informationsmedizin, Universitat Stuttgart am 17.07.1999, S. 47-52

[17] K. Meyl: Zur Brennglaswirkung des Mondes bei einer Sonnenfinsternis, NET-Journal (Neue Energie-techniken), ISSN 1420-9292, Heft 7/8-1999, S. 13-17, sowie INET-Kongress-Vortrag dazu: Freie Energie im nachsten Jahrtausend, am 9.10.1999, Holiday Inn Heidelberg (Walldorf)

[18] K. Meyl: Raum-Energie-Technologie, Wechselwirkung der Neutrinos und energietechnische Nutzung der Teslastrahlung, Teil 1, Magazin 2000 plus Nr. 144, Dezember 1999, S. 62-67

[19] K. Meyl: Raum-Energie-Technologie, Teil 2, Magazin 2000 plus Nr. 145, Jan./Feb. 2000, S. 60-65

[20] K. Meyl: Teslastrahlung, W.-B.-M. 4/2000, ISSN 0940-5984, S. 31-43

[21] K. Meyl: Skalarwellen, Hagia Chora 5/2000, ISSN 0940-5984, S. 31-43

[22] K. Meyl: Teslastrahlung - die drahtlose Ubertragung von Skalarwellen, Kongressband Bregenz vom 15./16.4.2000, S. 181-196, Jupiter-Verlag, ISBN 3-906571-18-1

[23] K. Meyl: Skalarwellentechnik, INDEL Verlagsabt. Villingen-S. 2000, 1. Aufl, ISBN 3-98O2542-6-7

[24] K. Meyl: Nichtoptische Sonnenfinstermsphanomene Teil 1, Magazin 2000 plus/148,6/2000, S. 10-13

[25] K. Meyl: Nichtoptische Sonnenfmsternisphanomene Teil 2, Magazin 2000 plus/150, 8/2000, S. 26-29

[26] K. Meyl: Nichtoptische Sonnenfmsternisphanomene Teil 3, Magazin 2000 plus/151,10/2000, S. 12-17

[27] K. Meyl: Longitudinalwellen-Experiment nach Nikola Tesla, Vortragsband der Deutschen Ges. fur Energetische und Informationsmedizin, Universitat Stuttgart am 6.+.7.10.2000, S. 4.1-4.9

[28] K. Meyl: Skalarwellen und ihre Bedeutung fur die Medizin, Kolloquium vom 6.-8.10.2000 Bad Nauheim der BIT-Arztegesellschaft Vortragsband, Seite 87-96.

[29] Johannes von Buttlar im Gesprach mit Prof. Dr. Konstantin Meyl: Neutrinopower, 1. Auflage 2000, Argo-Verlag Marktoberdorf, ISBN 3-98O6584-8-1

[30] K. Meyl: Skalarwellen-Ubertragung, NET-Journal, ISSN 1420-9292, Heft 12-2000, S. 31-34

[31] K. Meyl: Longitudinalwellen-Experiment, DVR-Info im NET-Journal, Heft 12-2000, S. 21-24

[32] K. Meyl: Erdbeben und Vulkanausbrtiche, GA-Magazin, Heft 6, 2000, S. 11-14

[33] K. Meyl: Atomuhren, die falsch gehen, GA-Magazin, Heft 8, 2001, S. 10-13

[34] K. Meyl: Umpolungsproblematik und Sintflut, GA-Magazin, Heft 10,2001, S. 10-14

The suitcase for experiments from Transfer Centre St. Georgen:

Scalar wave transmission according to Tesla

Bidirectional signal and energy transmission with longitudinal
waves faster than light in a resonant circuit

Get to know the Tesla radiation and its fantastic properties personally. Demonstrate, what no textbook of physics is able to explain!
The experiments, which 100 years ago still were extremely complicated, today fit into an aluminium suitcase, which can be acquired by purchase. Test yourself the historic statements and perform the following experiments:

- transmission of energy and information
- effect back from the receiver on the transmitter
- proof of free energy (1 to 3 times over-unity)
- scalar wave transmission with app. 1.5 times the speed of light
- tunnel effect or the lacking to shield the waves
- disproval of the near-field interpretation.

The kit is offered in two versions:

As a demonstration-kit for 800.- Euro (incl. VAT)
With this the 6 experiments can be carried out without further aids. (Target group are judges, doctors, architects, interested laymen, etc.)

and as an experimentation-kit for 1400.- Euro (incl. VAT) with three different Spulensatzen, Frequenzzahler and zusatzlichem material. (Target group are physicists, engineers, handicraft enthusiasts who like to experiment, etc.)

Weitere Informationen zum Set und zu den Biichern, zu deren Inhalt und zu Vortragsveranstaltungen im Internet unter: http: / /www.k-meyl.de and www.meyl.eu

INDEL GmbH, Verlagsabteilung, Fax: +49-/0- 7721-51870
Tel.: +49-/0- 7724-1770
Postal and ordering address:
l.TZS, Prof. Dr. K. Meyl, Leopoldstr. 1, D-78112 St. Georgen/Schwarzwald

[35] K. Meyl: HF-technische Hinweise zum Skalarwellen-Ubertragungs-Set, DVR-Mitgliederjournal Nr. 45, 1/2001, S. 20-22 und NET-Journal, ISSN 1420-9292, Heft 3/4-2001, S. 44-45
[36] K. Meyl: Stellungnahme zum Artikel im Spiegel, DVR-Mitgliederjouraal Nr. 46, 2/2001, S. 43-44
[37] K. Meyl: Stellungnahme zu dem Beitrag „Skalarwellenubertragung", W.-B.-M. 2/2001, Seite: 77-79
[38] K. Meyl: Scalar Waves: Theory and Experiments, Journal of Scientific Exploration, Vol. 15, No.2, June 2001, ISSN 0892-3310, pp.199-205.
[39] K. Meyl: Skalarwellenstrahlung. Welche Bedeutung haben Skalarwellen fur die Medizin? , CO" MED, Fachmagazin fur Complementar-Medizin Nr.6, Juni/2001, S. 55-60.
[40] K. Meyl: Advanced Conzepts for Wireless Energy Transfer, High efficient Power Engineering with Scalar Waves, International Congress-Publications, Weinfelden, 23/24.6. 01, Jupiter- Verl., pp. 41-49
[41] K. Meyl: Fortschrittliche Konzepte zur drahtlosen Energieubertragung, Hocheffiziente Energietechnologie mittels Skalarwellen, Kongress „Neue Wasserstofftechnologien und Raumantriebe" 23.-24. Juni 2001 CH-Weinfelden, Kongressband S. 25-40, Jupiter-Verlag, ISBN 3-906571-20-3
[42] K. Meyl: Schwingungsmedizin, Physikalisch-technische Aspekte komplementarmedizinischer Diagnose- und Therapieverfahren, G.E.I.M.-Vortrag am 6.10.2001 Universitat Kaiserslautern, GZM-Praxis und Wissenschaft, ISSN 1430-4554,7Jahrg. 1/2002, S. 50-55
[43] K. Meyl: Skalarwellen Teil 1: Grundlage einer erweiterten Feldtheorie und prakrische Konsequenzen der Maxwell-Naherung, NET-Journal, ISSN 1420-9292, Heft Juli/August 2002, S. 31-47
[44] K. Meyl: Skalarwellen Teil 2: Weltgleichung und Wellengleichung als Konsequenz der erweiterten Feldtheorie, NET-Journal, ISSN 1420-9292, Heft September/Oktober 2002, S. 44-47
[45] K. Meyl: Wirbelstrukturen als Element der Informationsubertragung in biologischen Systemen, Kolloquium vom 3.-5.10.2002 Bad Nauheim der BIT-Arztegesellschaft, Vortragsband, Seite 77-96.
[46] K. Meyl: Skalarwellen, Grundlage einer erweiterten Feldtheorie, Vortrag am VII.Kongress des IAG vom 18.-20.10.2002 in Mainz-Finthen, Kongressband ISBN 3-9804228-3-6 l.Aufl.2002, S. 118-135.
|47] K. Meyl: Nutzungsmoglichkeiten der Skalarwellentechnik, Neutrino-Power als Chance fur das neue Jahrtausend, Magazin 2000 plus I Nr.177, November/Dezember 2002, S. 60-63.
[48] K. Meyl: Schwingungsmedizin, Bioresonanz durch Skalarwellentechnik, Magazin 2000 plus I Nr. 178, Medizin Spezial 13,2002, S. 52-57
[49] K. Meyl: Die Wellengleichung, Grundlage der Skalarwellen-Physik, Magazin 2000 plus I Nr.179, Januar/Februar 2003, S. 6-12
[50] K. Meyl: Elektrische bzw. magnetische Skalarwellen im Kreuzfeuer der Kritik. Prof. Dr.-Ing. Konstantin Meyl nimmt Stellung zu kritischen Fragen, CO'MED, Nr. 1, Januar/2003, S. 52-54.
[51] K. Meyl: Freie Energie und Neutrinopower, Vortrag am 26.10.2002 in Bensheim auf dem Kongress: (Vom Band abgetippt von I.Schneider) Neue universale Energielosungen, Sammelband der Kongressbeitrage, Jupiter Verlag 2003, ISBN 3-906571-22-X, S.57-79
[52] K. Meyl (D.NeubronnerV. Die Rundfunkgotter, Teslawellen im Altertum, Matrix 3000 Band 16, 7/8-2003, ISSN 14394154, S.40-43
[53] K. Meyl: Erdwachstum durch Neutrinopower, Magazin 2000 plus Nr.188, Extra 3, 9/10-2003, S. 6-13
[54] K. Meyl: Faraday vs. Maxwell, Nikola Tesla Energy Science Conference, Washington DC 8.11.03, IRI
[55] K. Meyl: Physikalische Grundlagen fur die Informationsverarbeitung im Menschen, Kongressband zu den Festspieigesprachen 2002, (Hg. Simma Kletschka) Facultas Verlage Wien 2003, Band 27, Wiener Internationale Akademie fur Ganzheitsmedizin, ISBN 3-85076-648-9, Seite 38-59

by Prof. Dr.-Ing. Konstantin Meyl:

Sendetechnik der Gotter

Konstantin the Great is inaugurated in ancient send receive engineering by his teacher in the Roman emperor palace 304 A.D.

Abstract: l.Auflage 2004(in German)

- Has god Apollo in Delphi broadcasted at 5.4 MHz?
- Were the Greek temples telegraphy transmitters?
- Were the temple priests amateur radio operators?
- Was Homer radio reporter by order of the gods?
- Were the oracles receiving stations?
- Have oracle interpreters deciphered the transmission code?
- Which bridges did the Pontifex Maximus build?

All are questions, which are dealt with and explained in detail in 30 lessons. In the year 304 A.D. we witness, how the later Roman emperor Konstantin the Great is inaugurated in the secret broadcasting technique of the gods by his teacher. It is an exciting time of upheavel, because the old telegraphy is almost dead. The intestines of animals to sacrifice, from the convulsions of which the radio signals are read off, are scarce goods. Instead radiotelephony should be introduced, which had been tested successfully with the Pantheon in Rome by emperor Hadrian.
But new dispute is initiated: should broadcasting be introduced or rather cellular phone? But those, who tamper around without licence, are chased and fought as always.

When the book is available in English, you will be informed per internet:

www.k-meyl.de www.meyl.eu

INDEL GmbH, Verlagsabteilung, Fax: +49-7721-51870
Tel.: +49-7724-1770
Postal and ordering address:
l.TZS, Prof. Dr. K. Meyl, Leopoldstr. 1, D-78112 St. Georgen/Schwarzwald

B. Secondary literature (Publications about the theory of objectivity):

[1] P. Schellenberg: Buchbesprechung zu K. Meyl: Potentialwirbel, Bd. 1, Efodon News 6 (1992), S. 11

[2] Dr. R. Wohlleben: Buchbespr. zu K. Meyl: Potentialwirbel, Band 2, Frequenz 50 (1996) 1-2, S. 10

[3] Steinbeis-Stiftung fur WirtschaftsfOrderung: Technologiepreis fur STZ-Leiter, Transfer Zeitung 3/94 (1994), S.6

[4] A. Waser (Herausg.): Die ratselhafte Natur - The Puzzling Nature, AW Verlag, Luzern (1996), ISBN3-9521O59-O-2

[6] K. Lorek: Buchvorstellung in "Implosion", Biotechnische Nachrichten Nr. 116 (8/1996), S. 64

[7] Dr. H. Lumpe: Potentialwirbel, neues Weltbild; Raum & ZeitNr. 86, Marz/April 1997, S. 102-103

[8] Inge Schneider: Buchbesprechung zu K. Meyl: Elektromagnetische Umweltvertraglichkeit, Teil 1, NET-Journal, ISSN 1420-9292, Jg. Nr.2, Heft 3, Marz 1997, Seite 23

[9] W. Martin: Buchbesprechung zu Teil 1, Wetter-Boden-Mensch 2/1997, ISSN 0940-5984, S. 62-63.

[10] RTL: Prof Dr.-Ing.Meyl zu Gast bei der RTL-Talkshow von Ilona Christen am 30.5.97, abgedruckt im NET-Journal, ISSN 1420-9292, Jg. Nr.2, Heft 6/7 1997, Seite 30-31

[l1] Inge Schneider: zu „Prof. Dr.-Ing. Konstantin Meyls Buch Elektromagnetische Umweltvertraglichkeit", NET-Journal, ISSN 1420-9292, Jg. Nr.2, Heft 6/7 1997, Seite 32-33

[12] W. Heidrich: Geht die Expertentagung 1997 in die Geschichte ein? W.-B.-M. 6/1997, S. 3-4

[13] J. Heinzerling: Die Technik des dritten Jahrtausends, Magazin 2000 plus Nr.125, Marz 1998, S. 57/58

[14] Inge Schneider: Buchbesprechung zu K. Meyl: Elektromagnetische Umweltvertraglichkeit, Teil 2, NET-Journal, ISSN 1420-9292, Jg. Nr.4, Heft 3, Marz 1999, Seite 35

[15] W. Martin: Buchbesprechung zu Teil 2, Wetter-Boden-Mensch 2/1999, ISSN 0940-5984, S. 46+59.

[16] P.Rosch: Glanzend, Prof. Meyl zu Elektrosmog, Leserbrief, Magazin 2000 plus Nr.136, 2/1999, S. 77

[17] Portrait der Kongress-Referenten, zu Prof. Meyl: Energie aus dem Weltraum, 5. internationaler Kongress vom 26.-28.2.1999 in Dusseldorf, Magazin 2000 plus Nr. 136, 2/1999, S. 2 + 16 mit:

[18] P.Wiesner: Bericht zum 5. internationalen Kongress „Dialog mit dem Universum", zum Beitrag Prof. Meyl:„fordert eine dezentrale elektr. Energietechnik", Magazin 2000 plus Nr.136, 2/1999, S. 38-41

[19] I. Schlotterbeck: Bucher, die wir empfehlen, Magazin 2000 plus Mr. 142, Sept./Oktober 1999, S. 96

[20] H.-J. Ehlers: Freie Energie, Meyls Neutrino-These; Raum & Zeit Nr. 101, Sept./Oktober 1999, S. 94

[21] I, Schneider: Bericht zum Kongress vom 9.+10.10.99, Heidelberg, zu K. Meyl: Freie Energie im nachsten Jahrtausend, NET-Journal, ISSN 1420-9292, Jg. Nr.4, Heft 10/11, Okt./Nov. 1999, S. 8 ff.

[22] Sabine Krummer: Weltpremiere, Magazin 2000 plus Nr.145, 1+2/2000, S. 59 und im Schwarzwalder Bote vom 19.11.99: TP-Forum eroffhet mit Weltpremiere, Prof. Meyl berichtet iiber Teslawellen.

[23] Diermar Schindler: Neutrinos - Energie aus dem Kosmos, Schwarzwalder Bote Nr. 275 vom 27.11.99

[24] Schneider: Neutrino-Power - Energie aus dem Kosmos, Bericht zu Vortrag und Demo von Prof. Dr. K. Meyl am 25.11.1999 in Villingen, NET-Journal, ISSN 1420-9292, Jg. Nr.4, Heft 12/1999, Seite 4-6

[25] Schneider: Durchbruch in der Freien-Energie-Forschung; Interview mit Prof. Dr.-Ing. Konstantin Meyl, NET-Journal, ISSN 1420-9292, Jg. Nr.4, Heft 12, Dezember 1999, Seite 7-9.

[26] Dulling: Professor Meyl und die Freie Energie, TZ-Journal 1999/2000, Seite 5.

[27] Ulrich Arndt: Das Phanomen der Wirbel, Buchbesprechung zu Elektromagnetische Umweltvertraglichkeit Teil 1 und Teil 2, Esotera 1/2000, Verlag Hermann Bauer, S. 50,51

[28] Rainer Borgmann: Energie aus dem Kosmos, Magazin 2000 plus Nr. 145, Januar/Feb. 2000, S. 58-59

[29] Sabine Krummer: Wissenschaftler sprechen von Sensation, Im Villinger Technologie-Forum fuhrte Konstantin Meyl seine Skalarwellen vor, Schwarzwalder Bote vom 7.2.2000

[30] Dr.B.Tausendfreund: Uber biologische und medizinische Auswirkungen von elektrischen Potentialwirbeln und elektromagnetischen Longitudinalwellen,, CO'MED, 2/2000, S. 92

[31] Dr. H.Hantsche: Neues aus Physik und Technik, Info-Blatt der Feien Akademie, Berlin 3/2000, S.3

[32] A.Milinkovic: Weiterer Nachweis der Skalarwellen, NET-Journal, Jg. Nr.5, Heft 3, Marz 2000, S. 26

[33] Vorstellung des Referenten Prof Dr.-Ing. Konstantin Meyl, Kongressband Bregenz vom 15/16.4.2000, S. 180, Jupiter-Verlag, ISBN 3-906571-18-1

[34] Dr. Kunze: Leserbrief zu K.Meyl: Raum-Energie-Technologie, Magazin 2000 plus 147, 4-2000, S. 93

[35] Schneider: Teslastrahlung, die drahtlose Ubertragung von Skalarwellen von Prof. Dr.-Ing. Konstantin Meyl, NET-Journal, ISSN 1420-9292, Jg. Nr.5, Heft 4/5- 2000, Seite 14-15.

[36] Dr. Reichwein, Peters: Zellulare Elektromagnetische Systemsteuerung, Der Freie Arzt 5 (2000) im Wissenschafts-Forum (Anhang, S. IV - XXIII)

[37] Ulrich Arndt: Die Energie aus dem Nichts, Esotera 7/2000, Verlag Hermann Bauer, S. 62-66

[38] Besprechung zum Video „EMUV" von Prof. Dr. Meyl, Esotera 7/2000, Verlag Hermann Bauer, S. 30

[39] A.Manthey: Bericht zur Berliner Tagung fur neue Energietechnologien (8.7.2000), zu Theoretische Ansatze (u.a. K. Meyl), NET-Journal, ISSN 1420-9292, Jg. Nr.5, Heft 7/8 2000, S. 14 ff.

[40] Schneider: Uber das Experimentier-Set zur Ubertragung von Skalarwellen von Prof. Dr.-lng. Konstantin Meyl, NET-Journal, ISSN 1420-9292, Jg. Nr.5, Heft 9, September 2000, Seite 4-7.
[41] Buchbesprechung zu Prof. Dr.-Ing. Konstantin Meyl: Elektromagnetische Umweltvertraglichkeit, Teil 1 und Teil 2, Schweizerische Zeitschrift fur RGS, ISSN 1420-4894, Nr.233, Heft 4-2000, Seite 54-56
[42] Adolf und Inge Schneider: Energie aus dem All, ll.Kap.: Drahtlose Ubertragung von Skalarwellen durch Prof.Dr.-Ing.Konstantin Meyl, S.312-324, Jupiter Verlag 9/2000, l.Aufl. ISBN 3-906571-17-3.
[43] Dr.J.Lechner. Starfelddiagnostik, Medikamenten- und Materialtest Teil2, Kap.2.4.2 Beruhrungslose skalarwellengetragene Informationsubertragung, S. 173-178, Verlag Wtlhr 2000, ISBN 3-927344-44-3
[44] Dr. B. KOhler: Nachlese zum Jubilaumskolloquium der BIT-AG vom 6.-8.10.2000 in Bad Nauheim: Einen weiteren Hohepunkt stellte das Referat von Prof. K. Meyl dar,... COMED, 12/2000, S. 104
[45] Schneider: Buchbesprechung zu ,,Neutrinopower", NET-Journal, Jg. 5, Heft 12, Dezember 2000, S. 39
[46] Fachhochschule Furtwangen: Vorlesungsangebot fur das SS 2001, S.8, Prof. Dr. K. Meyl: EMUV.
[47] Vill: Die elektrophysikalische Mauerwerksentfeuchtung, EV.Verl.2001, ISBN 3-934139-04-3, S.26-33
[48] Kraft: Eroberung von physikalischem Neuland, Buchbesprechung zu ,,Neutrinopower", und
[49] Rattcher: Sind morphische Felder Neutrinos?, Zeit Geist, Heft 3,2001, S. 29 und S. 9.
[50] Dr.R.Kra6nigg: Skalare Wellen, Regulations Medizin 6, Heft 3, 2001, S. 89-96.
[51] Dr.A.Rossaint: Physikalische Grundlagen und biologisch-medizinische Schlussfolgerungen fur den beruhrungslosen Resonanztest Teil 1, Zeitschrift Hier & Jetzt, 3/2001, S.22-27 +Teil2,4/2001, S.22-25
[52] GZM-Kongress Berlin, 13.5.2001, zu dem Vortragenden Prof.Dr.K.Meyl: Skalare-/Teslawellen zur zellularen Energie- und Info. , GZM-Praxis und Wissenschaft, ISSN 1430-4554, 6,Jahrg. 1/2001, S.36
[53] Dr.P.Reichert: Die Medizin der Zukunft - Schwingungen start Pillen, Berlin Nachlese zum 6. Euro-paischen Kongress fur Ganzheitliche Zahn-Medizin 10.-13.5.2001, GZM-Praxis und Wissenschaft, ISSN 1430-4554, 6.Jahrg. 1/2001, S.56 zuK.Meyl: Schwingungsmedizin und Zellkommunikation.
[54] M.Dworschak: Schwarzwalder Kopernikus, Spiegel-Artikel vom 21.5.01, S. 198-199, abgedruckt im DVR-Mitgliederjournal 2/2001, Seite 41-42
[55] F.Lutz: Bis jetzt unwiderlegt, Wissenschaftler nehmen Professor Meyl in Schutz, Sudkurier Nr. 136 vom 16.6.2001 und Badische Zeitung vom 19.6.2002, Seite 22.
[56] S.Scheurer: Kopemikus untersucht Skalarwellen, Schweizerisches Bodensee Tagblatt Turgau, 21.6.01
[57] Schneider: Introduction of the author Prof.Dr.K.Meyl: Advanced Conzepts for Wireless Energy Transfer, International Congress-Publications, Weinfelden, 23./24.6.2001, Jupiter-Verlag, pp. 23-24.
[58] R.Schmid: Neues aus der Homoopathie-Forschung, zur Tagung der Samuel-Hahnemann-Stiftung vom 6.-8.4.2001 in Simmerath-E., Globuli 11/2001, S.11-12.
[59] Ralph Netzker: Jurassic Quark, Holden, Wegener, Meyl, ein theoretischer Dreisprang, im Internet unter http://home.t-online.de/home/ralph.netzker/quark.htm vom 25.10.01
[60] H.-P. Studer: Neue Energien fur die Zukunft, Vita Sana Magazin fur Dialog und Ges., 9/2001, S. 6-9
[61] Harro Wilke: Leserbrief zu Schwarzwalder Kopernikus, Magazin 2000 plus Nr. 164,10/2001, S. 92
[62] Dr. R.Krafinigg: Skalare Wellen, Arztezeitschrift fur Naturheilverfahren, 43, 1/2002, S. 19-27.
[63] Dr.C.Bollkampen: Bewusstsein im EnergetischenKontinuum, 10/2002, ISBN 3-8311-4016-2.
[64] A. und I. Schneider: Bericht vom Kongress ,,Universale Energielosungen", 26727.10.2002 in Bensheim, zu dem Beitrag von Prof.Dr.K.Meyl: Freie Energie und Neutrinopower, NET-Journal, Jg. 7, Heft 11/12 November/Dezember 2002, S. 21-28.
[65] Dr. P. Rothdach, Dr. H. Boiler u.a.m: Leserbriefe zum Beitrag: Elektromagnetische Skalarwellen im Kreuzfeuer der Kritik. COMED, 1/2003, S. 4-5 und COMED, 11/2002, S. 4: "Facit (Rothdach); Die Meylsche Theorie ist weder mathematisch, noch theoretisch-physikalisch noch experimentell widerlegt"!
[66] D. Schindler: Kopemikus aus dem Schwarzwald, Professor Meyl stellt neue Erkenntnisse der Teslastrahlumg vor, Bericht im Schwarzwalder Bote Nr. 46 VS, vom 25.02.2003
[67] H.-H. Gimbel: Neue Energielo'sungen, Kongressbericht, Wohnung + Gesundheit 3/03 Nr. 106, S. 60
[68] C. Nack: Umstritten aber begehrt. Viele Akademiker kamen Zum Experimentalvortrag von K. Meyl am 14.03.2003 im Technologiepark von Villingen-Schwenningen, Sudkurier 63/TG v. 17.03.03, S.27
[69] G. Hauser: ,,Gebaude der Physik wankt", Meyl sieht seine Theorie durch neueste Berichte bestatigt, Siidkuner Nr. 93/V, 23.04.2003
[70] Prof. Dr. J. Gruber: Grosser experimenteller Erfolg von Prof. Meyl, Energie aus dem Feld nachgewiesen! DVR-Mitglieder-Journal 1/03 Nr. 51 vom 4.4.03, ISSN 1435-0815, S. 101-102
[71] Dr. H. Kersten uber K. Meyl's Forschung: Erdwachstum durch Neutrinoabsorbtion, Technische Universitat Berlin, Internationales Kolloquium: Erdexpansion - eine Theorie auf dem Prufstand, Schloss Theuern am 24.+25.05.2003, Umdruck der TU Berlin Sekr. BH4 Lagerstattenforschung, s.a. Amberger Zeitung vom 28.5.03 und Amberger Nachrichten vom 29.5.03

[72] Dr. P. Rothdach: ,,SkalarwelIen gibt es nicht und die Welt ist eine Scheibe", GeoForum 24, 6/2003, Seite 20-22
[73] Inge Schneider: zu Prof. Dr.-Ing. K. Meyls Forschung: Antiker Gotterfunk und futuristische Skalar-wellenkommunikation, NET-Journal, Jg. Nr. 8, Heft 7/8 2003, Seite 31 (mit Ankundigungen zu Seminaren von Prof. Meyl in Munchen, an der Universitat Stuttgart und in Washington DC, Seite 42)
[74] J.K.Klasmann: Elektrosmog, Gefahrliche Felder? Gesundheit 9/2003, S.103-104.
[75] Gesundheitsrisiko Handy", Hauptreferent Professor Meyl..., Zollern-Alb-Kurier, 8.10.2003 und K.-H. Schlenker, Leserbrief vom 30.9.2003, s.a. Siidwest Presse: Kommission fordert Absenkung von Grenzwerten, Hohenzollerische Zeitung vom 7.10.2003.
[76] Dr. H.-J. Klose: Die Grundregulation des Menschen, Kongressband zu den Festspielgesprachen 2002, Simma-Kletschka (Herausgeber): Ganzheitliche Zahnheilkunde, Facultas Verlage Wien 2003, Band 27, Wiener Internationale Akademie fur Ganzheitsmedizin, ISBN 3-85076-648-9, Seite 95-98
[77] Dr. Valone, Integrity Research Institute: Nikola Tesla Energy Science Conference, Washington DC November 8th.+9th.2003, Conference publications, speakers biographies and abstracts.

C. Literature concerning the electromagnetic and biological compatibility

[1] R. O. Becker: Heilkraft und Gefahren der Elektrizitat (Cross Currents) 2. Aufl.Scherz Verlag (1994)
[2] P. Brodeur: Mikrowellen (The zapping of America) Augustus Verlag Augsburg (1989)
[3] EMVG: Gesetz uber die EMV von Geraten, Bundesgesetzblatt Teil I vom 9.11.1992
[4] Flanagan: Elixier der Jugendlichkeit, Waldthausen Verlag Ritterhude 1992, 1. Aufl.
[5] E. Habiger u. a.: Elektromagnetische Vertraglichkeit, 2. Aufl. Verlag Technik, Munchen 1992
[6] E. Habiger: EMV, Huthig Buch Verlag Heidelberg (1992), ISBN 3-7785-2O92-X
[7] E. Habiger: EMV-ubergreifende Aspekte zu benachbarten Problemfeldern, Elektrie 48 (1994), H. 5/6, S. 163-167
[8] N. Harthun: Naturgemasse Technik - Wege fur die Forschung nach Viktor Schauberger, Verlag Delta Design, Berlin 1996.
[9] H. L. KOnig: Unsichtbare Umwelt (Wetterfuhligk.), 5. Aufl., Verlag Moos & Partner Munchen
[10] Anton Kohling: Grundlagen der Funkentstorung in der Bundesrepublik Deutschland, etz Bd. 108 (1987), Heft 10.
[11] G. Nimtz: Mikrowellen, Einfiihrung in Theorie und Anwendung. 2. Aufl. Mannheim/Wien/Zurich: BI-Wissenschaftsverlag 199O, ISBN 3-411-O32O3-O
[12] Novitskii, Yu. I. : Effects of a magnetic field on the dry seeds of some cereals. Proceedings of Conference on the Effect of Magnetic Fields on Biological Objects, Moscow, p. 52, 1966.
[13] Plato: Samfliche Werke 5, Rowohlts Klassiker Nr. 47, S. 188,66e
[14] A. S. Presman: Electromagnetic Fields and Life. Plenum Press, New York - London, 197O
[15] V. Schauberger: Die Entdeckung der Levitationskraft, Implosion 1995 Nr. 112
[16] H. Schulz, W. Oppitz: Lokale Hyperthermie durch hochfrequente Wirbelstrome, Medizin Technik 1, 1987.
[17] G. A. Ulmer: Wellen- und Elektrosmog, Ulmer Verlag (1994) ISBN 3-924191-73-5
[18] Vitruvius Pollio, Marcus: Zehn Bucher uber Architektur, WBG 1987
[19] A. D. Watt and E. L. Maxwell: Characteristic of Atmospheric Noise from 1 to 1OO Kc/s. Symposium on the Propagation of VLF Waves, Boulder, Col., Paper 35, Jan. 1957.

D. Literature concerning physics in general (particle physics, etc.)

[1] H. Armbruster, G. Grunberger: Elektromagnetische Wellen im HF-Bereich, Huthig und Pflaum Verl.
[2] W. Bauer: Klassische Physik, Graphia Druck, Salzburg (1975), Eigenverlag.
[3] K. Bethge, U. E. Schroder: Elementarteilchen, Wissenschaftliche Buchgesellschaft Darmstadt (1986)
[4] G. Bosse, Grundlagen der Elektrotechnik II, BI 183, Hochschultaschenbuch-Verlag, Mannheim 1967
[5] Bronstein u.a.: Taschenbuch der Mathematik, 4.Neuaufl. Thun 1999
[6] A. Einstein: Grundztlge der Relativitatstheorie, S. 162, Anhang II; allg.Bemerkungen C, 5. Aufl., Vieweg + Sohn, Braunschweig 1973.
[7] A. P. French: Special Relativity, M.I.T. (1968) / Vieweg Verlag (1971) ISBN 3-528-O3546-3
[8] G. Galeczki, P. Marquardt: Requiem fur die Spezielle Relati vitat, Verlag Haag+Herchen (1997)
[9] U. Gradmann/H. Wolter: Grundlagen der Atomphysik, AVG, Frankfurt a.M. 1971.

[10] Grimsehl: Lehrbuch der Physik, 2.Bd, 17.Aufl. Teubner Verl. 1967
[11] J. D. Jackson, Classical Electrodynamics, 2nd. Ed., John Wiley, New York, 1975.
[12] Kleine Enzyklopadie Atom, Verlag Chemie GmbH, Weinheim 1970
[13] K. Kupfmuller: Einfilhrung in die theoretische Elektrotechnik, Springer-Verlag Berlin, 12. Aufl. 1988
[14] H. G. Kussner: Grundlagen einer einheitlichen Theorie der physikalischen Teilchen und Felder, Musterschmidt-Verlag, Gottingen 1976, ISBN 3-7881-6O35-7
[15] Kuchling: Physik, Gl. At4, VEB-Leipzig, 11. Aufl. 1974
[16] G. Lehner, Elektromagnetische Feldtheorie, Springer-Verlag Berlin, Heidelberg 1990.
[17] H.-J. Lugt: Vortex flow in nature und technology. Krieger publishing company 1995
[18] J. C. Maxwell: A Treatise on Electricity & Magnetism, vol.2, Chapter XX: Electromagnetic Theory of Light. Dover Publ. New York
[19] Meinke, Gundlach: Hochfrequenztechnik, 4.Aufl. Springer-Verlag Berlin 1986
[20] Mende, Simon: Physik, Gl. 10. 39, VEB-Leipzig, 4. Aufl. 1974
[21] G. Mierdel: Elektrophysik, Huthig Verlag Heidelberg (1972) ISBN 3-7785-O243-3
[22] O. Nachtmann: Phanomene und Konzepte der Elementarteilchenphysik, Vteweg, Braunschweig 1986, ISBN 3-528-O8926-1
[23] W. Pauli: Aufsatze und Vortrage uber Physik und Erkenntnistheorie, Vieweg + Sohn, Braunschw. 1961
[24] R.W. Pohl: Einfuhrung in die Physik, Bd.2 Elektrizitatslehre, 21.Aufl. Springer-Verlag 1975
[25] H. Preussker: Der Wirbelring, Halstenbeck 2002
[26] Shu-wen Zhou: Abnormal Physical Phenomena Observed When the Sun, Moon, and Earth are Aligned, 21st Century Science & Technology, Fall 1999, Vol. 12, No. 3, pp. 54-61.
[27] K. Simonyi, Theoretische Elektrotechnik. 7. Aufl. VEB Verlag Berlin 1979. S. 921 - 924.
[28] K. Simonyi: Physikalische Elektronik, Kap.: 8.4 Das Magnetron
[29] K. Stierstadt: Physik der Materie, VCH, Weinheim 1989.
[30] D. F. Taylor, On the Mechanism of Aluminium Corrosion in Metallized Film Capacitors, IEEE Transactions on EI-19, August 1984, No. 4, pp. 288-293.
[31] Jean-Pierre Vigier and the Stochastic Interpretation of Quantum Mechanics, selected and edited Stanley Jeffers, Bo Lehnert, Nils Abramson, and Leve Chebotarev. Montreal: Apeiron, 2000.
[32] A. Yializis, S. W. Cichanowski, D. G. Shaw: Electrode Corrosion in Metallized Polypropylene Capacitors, Proceedings of IEEE, Int. Symposium on Electrical Insulation, Bosten, Mass., June 1980;
[33] Zinke, Brunswig: Lehrbuch der Hochfrequenztechnik, 1. Bd., 3.Aufl. Springer-Verlag Berlin 1986

E. Literature concerning Tesla and criticism of textbook physics

[I] M. Cheney: Tesla, Man out of Time, Barnes & Noble Books, New York, 1993, ISBN O-88O29-419-1 und Omega-Verlag (1996) ISBN 3-93O243-O1-6
[2] D. H. Childress: The Fantastic Inventions of Nikola Tesla, Adventures Unlimited Press (1993)
[3] J. DeMeo: The Orgone Accumulator Handbook, ISBN O-9261855-O-7
[4] G. Galeczki, P. Marquardt: Requiem fur die Spezielle Relativitat, Haag+Herchen (1997),
[5] J. K. Kowalczynski: Critical Comments on the Discussion about Tachyonic Causal Paradoxes and the Concept of Superluminal Reference Frame, Intern. Journal to theoretical Physics, Vol. 23, No. 1, 1984
[6] J. Marinsek: Rationale Physik oder wissenschaftliche Science fiction? dbv-Verlag fur die Technische Universitat Graz (1989) ISBN 3-7O41-O176-1
[7] H. C. Montieth: The Unified Field Theorie, MUFON Symposium Proc, Seguin, Texas, 1980
[8] F. Moser: BewuBtsein in Raum und Zeit - Grundlagen einer holistischen Weltauffassung auf wissenschaftlicher Basis, Leykam Graz, 1989
[9] H. A. Nieper: Revolution in Technik, Medizin, Gesellschaft; MIT Verlag Oldenburg (1982)
[10] O. Oesterle: Ausweg aus der Sackgasse, Ein ganzheitliches naturwissenschaftliches Weltbild, 1. Aufl., Jupiter-Verlag, Bern 1996, ISBN 3-9O6571-16-5
[11] Rho Sigma (Dr. Rolf Schaffranke): Forschung in Fesseln, das Ratsel der Elektro-Gravitation. Ventla-Verlag, Wiesbaden (1972)
[12] N. Tesla: III. The Singular Misconception of the Wireless (Famos Scientific Illusions), Electrical Experimenter, Feb. 1919, p. 732.
[13] Tesla's verschollene Erfindungen, VAP, Wiesbaden (1994) ISBN 3-922367-93-3
[15] N. Tesla: Complete Patents, TeslaBook Company (1983) ISBN O-96O356-8-2, daraus:
[16] N. Tesla: Apparatus for Transmission of Electrical Energy, US-Patent-No.: 649,621, New York 1900, Dr. Nikola Tesla: Complete Patents pp318-321.

[17] Nikola Tesla: Method of and Apparatus for Controlling Mechanism of Moving Vessels or Vehicles, US-Pat. 1898, Nr. 613,809. Complete Patents: S. 351
[18] Nikola Tesla: Famous Scientific Illusions, III. The Singular Misconception of the Wireless, Electrical Experimenter, Feb. 1919, printed in Tesla Said, p. 197
[19] Nikola Tesla: The Problem of Increasing Human Energy, The Century Monthly Magazine, June 1900, ISBN 1-882137-00-0, Page i-15
[20] N. Tesla: Die Ubertragung elektrischer Energie ohne Drahte..., Electrical World and Engineer vom 7.1.1905; Edition TeslaBd. 4, S. 131.
[21] N. Tesla, New York Times vom 15.9.1908; Edition Tesla Bd. 6, S. 241.
[22] Tesla Said (J.T.Ratzlaff), Tesla Book Company, ISBN 0-914119-00-1
[23] N. Tesla: Experiments with Alternate Currents of High Potential and High Frequency, Lindsay Publications Inc, ISBN 0-917914-39-2
[24] W. Theimer: Die Relativitatstheorie, A.Francke AG Verlag Bern (1977) ISBN 3-772O-126O-4

F. Literature concerning geophysics, geology, geography and astronomy

[1]: Kendrick Frazier: Das Sonnensystem, Time-Life Bucher, Amsterdam (1991).
[2] Carey, S. W.: Theories of the Earth and Universe. University Press: 1-413, Stanford, California.
[3] Oesterle, O.: Goldene Mitte: Unser einziger Ausweg, Universal Experten Verlag, Rapperswil (1997)
[4] Hilgenberg, O. C: Vom wachsenden Erdball, Berlin 1933, Eigenverlag. und Neues Jahrb. Geol. Palaont. Abh. 116, 1, Berlin (1962).
[5] Jordan, P.: Die Expansion der Erde. Vieweg 1-180, Braunschweig (1966).
[6] Robert Bauval und Graham Hancock: Das Geheimnis der Pyramiden, Der Schlussel zur Sphinx, List Verlag (1996) und in S3 (Die grossen Ratsel VII) am 25.5.97
[7] Mitton, S. (Herausg.): Cambridge Enzyklopadie der Astronomie (The Cambridge Encyclopaedia of Astronomy), Orbis Verlag (1989).
[8] Miller, R.: Driftende Kontinente, Time-Life Bucher, Amsterdam (1991).
[9] Hermann Wild: Technologien von gestern, Chancen fur morgen, Jupiter-Verlag Bern 1996
[10] Zecharia Sitchin: The Lost Realms, Knaur Verlag Munchen 1992, ISBN 3-426-04827-2
[l1] Werner Raffetseder: Sonnenfinsternis, Hugendubel Verlag, Munchen 1999, ISBN 3-89631 -302-9

G. Literature concerning free energy

[1] R. L. Clark: Tesla Scalar Wave Systems, The Earth as a Capacitor, The Fantastic Inventions of Nikola Tesla, ISBN 0-932813-19-4
[2] H.-P. Thietz: Tatort Erde, VAP (1996), ISBN 3-922367-62-3
[3] Louis Kervran: Biological Transmutations, s.a.:
[4] J. Heinzerling: Energie aus dem Nichts, Bettendorf'sche Verlagsanstalt, 1. Aufl. 1996
[5] J. Manning: The Coming Energy Revolution - The Search For Free Energy, Avery Publishing Group, New York, USA, 1996 und Omega-Verlag, Dusseldorf 1997.
[6] G. Hilscher: Energie fur das 3. Jahrtausend, VAP-Verlag Wiesbaden 1996
[7] A. Schneider: Energien aus dem Kosmos, Jupiter-Verlag 1989
[8] I. Schneider: Neue Technologien zur Freien Energie, Jupiter-Verl. 1994, S. 14
[9] Dr. H. A. Nieper: Revolution in Technik, Medizin, Gesellschaft; MIT Verlag Oldenburg (1982)
[10] Prof. Shinchi Seike: The Principles of Ultra Relativity, Space Research Institute, 1990, ISBN 915517-1
[11] M. Cheney: Nikola Tesla, Man out of Time, Barnes & Noble Books, New York, 1993, ISBN O-88O29-419-1 und Omega-Verlag (1996) ISBN 3-93O243-O1-6
[12] Prof. J. Gruber: Kalte Fusion und Raumenergie, Bericht zur 7. Internationalen Konferenz uber "kalte Fusion" vom 19.-24.4.1998 in Vanvouver, B.C., Kanada (Infinite Energy, Issue 19, 1998) und Bericht zum "International Symposium on New Energy" vom 23.-26.5.1997 in Denver, Colorado, USA (Denver-Bericht der Fern Universitat Hagen)
[13] H.-J. Ehlers: Special 7, Raum & Zeit Dokumentation, EHLERS Verlag, Sauerlach, 1. Aufl. (1994)
[14] O. Alexandersson: Lebendes Wasser; W.Ennsthaler Verlag Steyr, 1993
[15] V. Schauberger: Die Entdeckung der Levitationskraft, Implosion 1995 Nr. 112
[16] A. Waser (Herausg.): Die ratselhafte Natur - The Puzzling Nature, AW Verlag, Luzern (1996), ISBN 3-9521O59-O-2

H. Literature concerning medicine, biology and chemistry

[1] U. Luttge, M. Kluge, G. Bauer: Botanik, 2. Aufl.- Weinheim, VCH (1994) ISBN 3-527-30031-7
[2] N.Begich: Towards A New Alchemy, The Millenium Science, Earthpulse Press 1996, dt. Ubers.: Auf den Spuren einer neuen Alchemie, Omega-Verlag 1997
[3] Couto: Die kosmische Oktave, Synthesis Verlag Essen 1984
[4] Prof. Dr. H. Heine: Grundregulation und Extrazellulare Matrix - Grundlagen und Systematik, Lehrbuch der biologischen Medizin, (1991) 2.Aufl. Hippokrates Verlag Stuttgart, Seite 63
[5] U. Warnke: Bioresonanztherapie - Wunsch und Wirklichkeit. Medizin transparent Nr.2/1996, S.36-37
[6] Dr. H. Clark: The Cure For All Diseases (1995), dt. Ubers.: Heilung ist moglich (1997) Knaur Verlag
[7] Dr. Hulda Clark: The Cure for All Cancers (1993) New Century Press, USA, dt.Ubers.: Heilverfahren aller Krebsarten
[8] Dr. Bodo Kohler: Biophysikalische Informations-Therapie, Gustav Fischer Verlag (1997)
[9] Dr. Bodo Kohler: BITsyn, der neue Weg in der Informations-Medizin, Jubilaums-Schrift der Intern. Arzte-Gesellschaft fur Biophysikalische Informations-Therapie, Bad Nauheim, 6.-8.10.2000.
[10] Bioenergetische Messverfahren in Theorie und Praxis, Vortragsband der Gesellschaft fur Energetische und Informationsmedizin e.V., Universitat Stuttgart am 17.7.1999 und am 7.10.2000
[11] Dr. Johann Lechner: Storfelddiagnostik, Medikamenten- und Materialtest, Teil 2 aus der Reihe: Praxis der Ganzheitlichen Medizin und Zahnmedizin, Verlag Dr. E. Wuhr (2000)
[12] M. Luscher: Der 4-Farben-Mensch, W. Goldmann, Munchen 1977
[13] M.Luscher: Das Harmoniegesetz in uns, Econ-Verlag 1993
[14] FA. Popp: Neue Horizonte in der Medizin, 2.Aufl. Haug Verlag Heidelberg 1987
[15] M.Bischoff: Biophotonen, das Licht in unseren Zellen, 2001

J. Literature concerning history and more peripheral subjects

[1] David Ash, Peter Hewitt: Science of the gods, Gateway Books, Bath, 1990.
[2] T.E.Bearden: Skalar Technologie, Michaels Verlag 2002, ISBN 3-89539-250-2.
[3] Thomas Valone: Das Unipolarhandbuch, Michaels Verlag 2001, ISBN 3-89539-295-2.
[4] R. Sheldrake: Sieben Experimente, die die Welt verandera konnten. Goldmann Verlag 1994
[5] R. Sheldrake: Das schopferische Universum. Meyster Verlag Munchen 1983.
[6] H.Ludeling: Handbuch der Radiaesthesie, Verlag Eike Hensch 1994, ISBN 3-927407-09-7.
[7] Hensch: Radiaesthesie im landlichen Bauen und Siedeln, Arbeitskreis zur Landentwicklung in Hessen, W4, Wiesbaden 1987
[8] H. Mayer, G. Winklbaur: Biostrahlen, Verlag ORAC, Wien 1989, 5. Auflage
[9] Rohrbach: Radiasthesie, Physikalische Grundlagen und Anwendung in Geobiologie und Medizin, Haug Verlag Heidelberg 1996.
[10] R. Schneider: Einfiihrung in die Radiasthesie Teil II: Leitfaden und Lehrkurs ..., Oktogon-Verlag, Wertheim, 2. Aufl. (1984).
[11] Lamer: Worterbuch der Antike, Kroner Verl. Bd.96
[12] K. Schefold: Die Griechen und ihre Nachbam, Propylaen Kunstgeschichte Berlin Bd. 1
[13] T. Kraus: Das romische Weltreich, Propylaen Kunstgeschichte Berlin Bd. 2
[14] G. Gruben: Die Tempel der Griechen, Wissenschaftliche Buchgesellschaft Darmstadt 1986
[15] E. Horst: Konstantin der Grosse, Eine Biographie, Classen Verlag 1985 Dusseldorf, 2.Aufl.
[16] Vitruv (Marcus Vitruvius Pollio): Zehn Bucher uber Architektur, Ubers. von Dr. K. Fensterbusch, Wissenschaftl. Buchges. Darmstadt 1987,4. Aufl.
[17] A. Springer: Das Altertum, A. Kroner Verl. Leipzig 1915, 10. Aufl.